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HEREDITY HEALTH
AND
PERSONAL BEAUTY
BY
J.V. SHOEMAKER A.M.M.D.

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Class of 1884

Professor of Arabic







HEREDITY, HEALTH AND PERSONAL BEAUTY.

BY

JOHN V. SHOEMAKER, A.M., M.D.,

PROFESSOR OF MATERIA MEDICA, PHARMACOLOGY, THERAPEUTICS, AND CLINICAL MEDICINE, AND CLINICAL
PROFESSOR OF DISEASES OF THE SKIN IN THE MEDICO-CHIRURGICAL COLLEGE OF PHILADELPHIA;
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SOCIETIES, THE AMERICAN ACADEMY OF MEDICINE, THE BRITISH MEDICAL
ASSOCIATION; FELLOW OF THE MEDICAL SOCIETY OF LONDON, ETC.

"The law of the wise is the fountain of life."—PROVERBS.



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Prof. James R. Jewett

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PREFACE.

CRITICS poke fun at authors by saying that the Preface is the author's apology for his unsolicited appearance before the public. But, why is it thereby implied that authors are more than likely to be mistaken in their view that they will supply a public want, when we consider that wants follow created, as well as existing, needs?

We begin the customary apology by remarking that there is among educated persons a generally confessed need of popular instruction as to matters of health, and of all things indirectly appertaining thereto; and this, in effect, is the concession of the existence of a considerable public need. There can be no dissent from the conclusion that the want arising from this need can be increased by perceptions aroused by such treatment of the subject of well-being as we have here endeavored to employ; that, in a word, supply will increase the public demand for instruction in this branch of knowledge. If, therefore, this work prove satisfactorily to have accomplished the purpose in view, it will be gratifying, not otherwise, to find it secure of a lease of life.

There are three points touched upon, the discussion of which, it is hoped, may prove not uninteresting even to members of the medical profession. These are comprehended by the Introduction and the chapters on the complexion and the hair. Consideration of the value of August Weismann's conclusions touches at present the extremes of discussion by scientific and agricultural societies, and those conclusions, relating to questions as to the transmission of both healthy and morbid conditions, deeply concern the physician.

1519 WALNUT STREET,
PHILADELPHIA, October, 1890.

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Baldness. Bites of insects and eruptions. Blackheads of the skin. Boils. Bunions. Burns. Burns and scalds. Carbuncle. Chapped and cracked lips. Chapping of the skin. Chaps and rough skin of the

hands. Chaps or cracks at the corners of the mouth. Cracks and irritation around the nose. Cracks or fissures of the skin. Cracks or irritation inside of the nose. Corns or bunions. Dyspepsia. Falling of the hair. Fever-blisters. Freckles and yellow discolorations of the skin. Frost-bite. Hazeline cream. Inflamed or rough skin. Itching around the bowel. Itching of the skin. Lanolin cold-cream, pomade, and soap. Laxative for children. Moisture of the hands. Mouth-washes. Nettle-rash (hives). Pain or irritation of the skin. Perspiration (excessive). Perspiration (excessive or odorous). Perspiration (odorous). Pigmented spots on the skin. Pigment-spots of pregnancy. Pimples. Plugs or grubs of the skin. Poisoning from ivy, etc. Prickly heat. Rough, pimply neck and limbs. Scars. Sores on lips, mouth, tongue, or throat (canker sores). Sunburn. Thick skin on hands or feet. Toothache. Warts. Whitlow—Felon.

Heredity, Health, and Personal Beauty.

INTRODUCTION.

WHEN we began to write this work we thought, as the text clearly indicates, to impart some information strictly limited to the non-scientific world. We aimed no higher than to correct some popular errors regarding the theory of evolution, and, in addition, to call attention to certain heretofore unnoticed results of the law, the existence of which the theory affirms. Little did we dream that, before we had long entered upon our task, we should happen upon a recent essay of a member of a learned society, in which it is implied that Darwin, in his particular theory of the causes of organic evolution, does not accord full recognition to the inheritable effects of the use and disuse of vital parts by an organism, and that, when scarcely recovered from this surprise, it would be renewed by the statement of a member of another learned society, who contended that only congenital characters are inherited, because acquired characters are not inheritable.

The second *dictum*, that only congenital characters are inherited because acquired characters are not inheritable, begs the question in dispute, for the other side contend that characters, perforce of their being acquired, become congenital. The first *dictum*, in which it was implied that Darwin did not recognize fully the effects of the use and disuse of vital parts by organisms as among the agencies of change in them and their descendants, shows that he who holds that opinion has not read Darwin with sufficient attention to know that not only are those effects of use and disuse explicitly and often recognized by

Darwin, and more and more as he advanced in life, but that their affirmation pervades his whole theory of evolution by natural selection as a minor but great and indispensable cause of the change observable in organisms.

We must here preliminarily clear the ground of obstacles to a correct understanding of the particular point which we have in view for discussion,—the heritability of acquired characters,—by describing the distinction made between the effects in the transmission of life in organisms, due to the pressure of external circumstances under purely natural conditions, as compared with similar effects taking place in them through the agency of man, or exceptionally arising we know not whence. The first conception is derived from that view of life which regards it as tending to perpetuate, while modifying, the characters of organisms through countless ages, presenting itself to our minds as indissolubly linked heredity. The second conception is derived (according to its advocates) from that view of life which ascribes to characters, derived from changed habits and the use and disuse of vital parts, through artificial selection (man's agency mingling with nature's), obedience to the same law of heredity. It is the second class of these conditions, assumed as inducing change, which some persons deny as having the slightest influence toward hereditary transmission. These latter conditions are, nevertheless, those which are denominated by all persons "acquired characters," although, as will appear later, that is only for convenience of distinction, characters representing the change produced by purely natural selection having been acquired, and universally admitted in various degrees to have been acquired, by all who believe in any form of organic evolution,—that is, of course, congenitally acquired.

This objection is made in the face of many contradictory facts, contained in the inclusive contradictory fact of all, that every organism must be, at any given instant of time, the

product, fundamentally, of natural forces constrained along lines of development imposed by external conditions, no matter whence derived, and capable of transmitting whatever it possesses, however acquired. It would seem that it should be apparent, we insist, that it is the existing form, however acquired, that must be transmitted, actually or potentially, to render possible the protean changes which organisms exhibit. Briefly, Darwin's theory of organic evolution, aside from its features of artificial and sexual selection, as is clearly to be seen by any one who carefully reads his works, and, as is admirably set forth by Herbert Spencer in his "Factors of Organic Evolution," recognizes that the power of both natural and artificial selection to accumulate variations would be neutralized, unless use and disuse of parts by organisms so changing did not continuously tend to mold them, functionally and structurally, as associated with environment, in directions conformable to the primary change.

- He who accepts Darwin's theory of evolution, which involves recognition of the strictest heredity through all the changes wrought by natural selection, should logically also accept hereditability for characters otherwise acquired. He sees, as the effect of stress in purely natural environment, all change handed down to posterity, and everywhere discarded forms dwindled to rudiments in the adult animal, or lying latent in the embryo, and he has no logical right to regard change beyond the apparent limits of stress in natural environment as beyond the pale of transmission to posterity. The demonstrable, systemic change in natural environment is the cogent underlying ground for belief that all change, regardless of the fact that an environment may not be purely natural, is transmitted, at least potentially, even if it escape our demonstration in the individual case as existing. This is the *à priori* deduction from acceptance of the theory of natural selection as true, but it is, *à posteriori*, supported by numerous facts that do not seem to reach the

apprehension of the opponents of this view. This state of mind is well described by Herbert Spencer, when, in speaking of the dawn of discussion as to organic evolution, he said, "I look back with surprise at the way in which the facts which were congruous with the espoused view monopolized consciousness and kept out the facts which were incongruous with it—conspicuous though many of them were."

Considering that man is the summit of nature as we know it on earth, in whom nature is completed and crowned, and that the effects of his agency are, therefore, a part of nature; considering, too, that nature's deviations upon its sole responsibility are not always explicable; considering all the facts we know, it seems blind to limit the power of evolution to lines beyond which we may well ask, If it be not Nature there working, what is working there? Yet it is denied, by such persons as we have described, that characters are acquired except through natural selection. They explicitly rule out as transmissible not only characters arising from physiological, but also those arising from pathological, change of function; that is, they dispute the existence of the hereditability of acquired characters, whether in health or disease.

Let us, for the sake of obtaining a broader view of the general subject under discussion, note in passing the difference between the two existing doctrines of evolution. One side holds that incorporate with the organism itself is the principle of its life and growth, largely independent of environment. That is to say, according to this view, environment represents only an auxiliary principle in development. This view, it ought to be seen at a glance, is untenable in face of the large adaptedness of living things at a given instant of time to their environment. So close is this relation of living things to their surroundings that unscientific persons still regard them as having been created from the beginning just as they now exist.

The other side to this controversy—which side, with whatever modifications, includes the mass of scientific men—is with Darwin. It grants that the organism is, in fact, endowed with a vital principle involving determinate tendencies as to size, form, and habitat, but affirms that it is, through the character of its environment, modified so as to be in accord with change in the environment, or else is extirpated. In other words, it is alleged by this side that the vital principle and law of growth in an organism represent forces which encounter in the organism other forces represented by the environment, and that, as the organism must in consequence either live or die, or have well or ill being, according to the suitability or unsuitability of its environment, or its final ability or inability to conform to its environment, the character of its existence at any given point of time is the resultant of those forces, plus the concomitant force of conformability in function and structure to the primary change through the use and disuse of vital parts of the organism. According to this theory, in which we have implicit faith, the principle with which the organism is endowed renders it, with time, more or less adapted to its changed environment, individuals incapable of variation dying off, and, if without sufficient time, all paying the penalty of death from inability to meet the new demand upon their vitality.

That the effects of use and disuse of vital parts are, in fact, if not clearly, implied by the doctrine of the survival of the fittest in the struggle for existence, ought to be seen when we consider that, in the change of species through the ages, nature could have given nothing directly out of hand, but only indirectly, as by parcels, through the medium of both environment and habit acting on the organism. A variety issuing out of the loins, so to speak, of its predecessors, to be perhaps finally represented by a species very unlike them, is subjected by nature to what, to enable it to change? Fundamentally to changed

exterior physical conditions. But the coincident effect to which it is subjected, inseparable from those new conditions, is the tendency to the use and disuse of vital parts. The tendency in this case means the actual use and disuse, however at first feeble, of those vital parts of the organism. Use and disuse of such parts could be the only efficient cause, relatively speaking, of securing *stability* of the primary modifications from natural selection. Given variability, which is admitted, and variation, which must be if variability is, and we find that use and disuse of vital parts, internal as well as external, must accompany and confirm primary change, or else it would prove abortive. How otherwise can we understand that, in the course of ages, structures have changed so as, without scrutiny of many intermediate forms, to render animals hardly recognizable as the descendants of their demonstrated ancestors, when at the same time we recognize them as so well adapted to their present environment, and the old form as less adapted to it, or not at all?

Hence we, for our part, contend that change of function is inseparable from change of structure, that they are so intimately mixed in the bond of life that they change *pari passu*, and that discussing them separately should be regarded only as a matter of convenience. Hence, we believe in the transmission of all characters, however acquired, for there is, *à priori*, no reason for excluding the germinative plasm of organisms from the somatic or bodily plasm of organisms, and, *à posteriori*, no reason for so doing in the face of a multitude of confirmatory facts.

In the affection of the germinative plasm of the organism, concomitantly with the outward change of the organism, through change of environment and all that that implies in changed habits and food, and through use and disuse of vital parts and consequent change in function and structure, all the effects shown in the adaptation of the organism, through its reaction to its environment, are summed up. Unless this be the process

of organic development it is subject to no law but that which makes it the false seeming of a reality. Therefore, as law is apparently omnipresent we can afford to say that, unless it be a real law that we seem to see, there is no organic evolution; but, on the contrary, if that seeming be real, that the law involves the transmission of all characters, those arising from the intervention of man, those termed fortuitous, as well as those arising in the stress of the most implacable struggle for existence, and consequently in all these blended.

The reader is now better prepared to consider understandingly the statements which, we said at the beginning, had awakened our surprise. We will treat of them *seriatim*, with somewhat more amplification than as there recorded.

The first learned gentleman attempted to show that, the vital principle apart, all organic changes are, within the environment, chiefly consequent upon the use and disuse of vital parts. This is not, as we have intimated, a correct view. The use and disuse of vital parts is a *vera causa*, but not the primary one. The primary one, in order of importance and time, is the action of nature, exclusive or inclusive of man, in producing the variation which other agencies, even artificial and sexual selection in the higher organisms, subsequently contribute to mold. If, in the stress which nature puts upon organic life, disuse did not follow diminished usefulness, and increased usefulness greater use, and structure in conformity to both, change could not be permanent, for variation in any part necessitates functional and structural change in all, especially in co-ordinate parts. Whatever Darwin might have said, the effect of use and disuse of parts must lie back of his theory of organic evolution as the indispensable cause of permanent change; not of mere change, let the reader mark, but of permanent change in determinate directions. Darwin, however, affirms the fact in some places in his works and implies it in others. In the following passage he

affirms it with singular conclusiveness, because he is repudiating there the representation that had been made by his critics to the contrary effect. In the preface to the second edition of "The Descent of Man" he says :—

I may take this opportunity of remarking that my critics frequently assume that I attribute all changes of corporeal structure and mental power exclusively to the natural selection of such variations as are often called spontaneous; whereas, even in the first edition of "The Origin of Species," I distinctly stated that great weight must be attributed to the inherited effects of use and disuse with respect both to the body and mind.

If natural selection stopped short at putting stress upon organisms, even the forms most susceptible of correlated change might not be capable of resisting death. But, assuming within an exterior change at least temporary endurance of the new conditions, no organism, without use and disuse of existing parts, could rise or fall, in function or structure, above or below the forms best adapted to survive at the time of the changed conditions. The fittest at that time, if they survived, would remain through their descendants, if the exterior conditions did not again change, the fittest for all time to survive. There would be no evolution,—that is, no development to higher or lower forms: their status would be permanently fixed. An aquatic animal could not have become a terrestrial one, nor a terrestrial one, as in the case of the placental mammal, the whale, an aquatic one.

Nature can modify nothing to the extent of making it a new creation merely by putting stress upon it. Stress is more than negative: it represents opposition where it does not represent antagonism. Opposition does not of itself create by the slowest, or any, process. Only, as from the effects of use and disuse of parts in changing function and structure, is it possible to conceive of organisms subjected to change in environment continuing to live with different aspects under changed conditions.

We have already remarked of the second learned gentleman's

contention, that only congenital characters are inherited because acquired characters are not inheritable, that it is a begging of the question whether acquired characters do or do not become congenital. As, however, his *dictum* comes within the lines of what a much more prominent man, August Weismann, thinks, we will examine some of the points made by the latter in his work, "Essays upon Heredity and Kindred Biological Problems." We quote from the late English translation of Weismann's work (page 85) as follows :—

When the wild duck became domesticated and lived in a farm-yard, all the individuals were compelled to walk and stand more than they had done previously, and the muscles of the leg were used to a correspondingly greater degree. The same thing happens in the wild state when any change in the conditions of life compels an organ to be more largely used. No individual will be able to avoid this extra use, and each will endeavor to accommodate itself to the new conditions according to its power. The amount of this power depends upon the predisposition of the germ, and natural selection, while it apparently decides between individuals of various degrees of strength, is, in truth, operating upon the stronger and weaker germs.

This statement, whether or not Weismann saw the absurd consequence, means that the prepotential force of the original germinative plasm so overrides every other tendency of the wild duck that the *germ* must contain in itself special reference to the duck's becoming pedestrian in a wild state, or as belonging to a farm-yard breed.

Weismann says, on page 189 of the translation mentioned :—

E. Roth has objected that in pathology we everywhere meet with the fact that acquired local disease may be transmitted to the offspring as a predisposition ; but all such cases are exposed to the serious criticism that the very point that first needs to be placed on a secure footing is incapable of proof, viz., the hypothesis that the causes which in each particular case led to the predisposition were really acquired.

What is the question ? It is whether or not disease can be inherited. Weismann says that it cannot be, unless the predisposition, as having been acquired, can be demonstrated. This slams the door in the face of the anxious inquirer after truth, for, no matter how many or few generations in a line of descent

one might go back to find a point when the predisposition had been acquired, the answer would be, despite all circumstantial evidence proving the fact of such acquirement, How do you positively know that it was then acquired? Weismann's position in this denial is a very safe one, for it renders, so far as he is concerned, all prospect of a solution of the question impossible, through evasion of the conclusions that are deemed legitimate from recognized premises in similar investigations. Primeval perpetuity, according to his statement, must be allowed to predisposition, and its ever being an acquired character may, therefore, be safely denied. According to this *dictum*, the first man must have had a disease badly to have been able to transmit it so far.

On page 269 of the translation, Weismann out-herods Herod in this kind of argumentation, when stating that—

The children of accomplished pianists do not inherit the art of playing the piano; they have to learn it in the same laborious manner as that by which their parents acquired it; they do not inherit anything except that which their parents possessed when children, viz., manual dexterity and a good ear.

Did any one ever claim that it is necessary to the doctrine of hereditability of acquired characters that such a possession as this should be proved to have been transmitted? This is not an acquired character,—it is not a character at all; it is an acquired art. Weismann might as well have said that we do not observe that the children of famous pianists are born with a piano. He goes on to say in the same passage:—

Furthermore, language is not transmitted to our children, although it has been practiced not only by ourselves, but by an almost endless line of ancestors.

Why, is it not known on all sides that articulation, without reference to language, is but a faculty only secondarily combined with organs whose primary function is for an entirely different purpose, and that speech, as the existence of different languages proves, is only a conventional mode of communicating thought,

and constitutes merely an art? Who ever thought of claiming that any art—music, speech, painting, or sculpture, or aught else that is extrinsic to the body—could be affected by heredity? Such arguments as these make one lose all confidence in the conclusions of Weismann's personal microscopical investigations, in which otherwise one would gladly look for instruction.

With one more citation from this work on heredity, we conclude the presentation of what we deem sufficient evidence to prove the utter unreliability of Weismann's conclusions. It is to be found on pages 95 and 96 of the work hitherto quoted from :—

In my opinion, there is absolutely no trustworthy proof that talents have been improved by their exercise through the course of a long series of generations. The Bach family shows that musical talent, and the Bernoulli family that mathematical power, can be transmitted from generation to generation, but this teaches us nothing as to the origin of such talents. In both families the high-water mark of talent lies not at the end of the series of generations, as it should do if the results of the practice are transmitted, but in the middle.

This proves nothing but that the intermixture of other blood, not specially endowed in the same direction, diminishes mental manifestation of the original talent. It has been proved repeatedly by Galton and others that descent in the direct line, despite this intermixture, has long shown hereditary qualities of marked type, generation after generation of persons peculiarly adapted to certain employments being engaged in them in numbers so great that it is impossible to suppose that those employments were originally sought by all on account of their special personal aptitude for them. If the increased speed of the trotting horse within fifty years, from a mile in two-forty to about a mile in two-ten, is not significant of change in the animal, due to appropriate change in function and structure, in addition to the effects of artificial selection of stock to breed from, what else will account for it? The gait, as a fast one, is not natural to the horse; the extreme development of what the

best horse could at first do with practice in the trot was soon reached ; artificial selection could find nothing better than was at first discovered in the way of stock to breed from. Whence, then, can come what still remains to be accounted for in the enormous increase, in fifty years, of speed in the trotter, but from its having been modified in function and structure, and the effects transmitted to the progeny? If men and women did not mate for love and money and a thousand other motives than with reference to the qualities of their descendants, but, like the domesticated animals, were bred for various qualities, we could make great musicians, painters, mathematicians, generals, or athletes, at pleasure, unchecked save by the occasional effect of atavism. Although this will never be, we may yet clearly perceive, if we but observe closely, with minds divested of prejudice, the working of the indicated law, which, as it has ever done, holds important sway at all times and in all places on earth.

CHAPTER I.

THE GENERAL LAWS OF HEALTH.

IN entering upon the subject of health and personal beauty, which are correlated, it is best to consider, first, what is life, which includes them both. The obvious reason for this course is that if health and physical beauty depend on the observance of the laws of life, at least upon those of well-being, without which life would not be worth living, then we can best understand the production and maintenance of these attributes through knowledge of their source.

The most ordinary observer recognizes everywhere the difference between life, both animal and vegetal, and mere stocks and stones. He sees that the crucial test of life is ability or inability to produce after the manner of the kind,—animals, animals; vegetables, vegetables. He knows perfectly well that a block of red sandstone is derived from a stratum of the earth's crust, but is not one of its descendants, while from the highest animal to the lowest they are respectively the progeny of similar beings. He sees this distinction as clearly as does the most profound man of science, with one exception. This exception is that he does not know, what is largely the revelation through the microscope, of the existence of a world which has always been beyond his ken, in which animal and vegetable forms so descend in the scale of life, or, more properly speaking, have not risen in it, that they are sometimes scarcely distinguishable, and sometimes not at all. In a word, barring this exception, the most ignorant of men sees as clearly as the most instructed the essential difference between the organic and the inorganic world.

But that is only a small step, although, as being the first, an indispensable one to comprehension of life in its various

aspects. Until one has grasped and firmly holds the central idea that all life is fundamentally represented by different kinds of cells, which also produce after the manner of their kind, through various transformations, he fails to obtain possession of the clue which leads to perception of many of the consequences which environ living things. The old doctrine of the naturalist was that all life is derived from an egg. The doctrine of the modern naturalist is that all life proceeds from a cell, for an egg is nothing but a complex, or, as he would call it, a differentiated cell. It is the germinal vesicle of the specialized cell of the egg that fundamentally contains life. All else of the egg, in yolk and albumen, is merely concentrated proteid food for the nourishment of its growing inmate, or shell for its protection during the period of incubation.

In both animals and vegetables, from the lowest organisms, consisting of a single cell, to the highest manifestations of life in each, consisting of untold numbers of cells, the unit of life is the cell, capable, in health, through unknown laws, of reproducing its kind, and of changing its manifestations of kind in the formation of varying products. Bones, marrow, cartilage, tissues of all sorts in the human body are nothing but the final temporary resting-stage of cells which have assumed protean forms and functions. Even the blood itself, through which the whole organism is revived, is to be regarded physiologically as a tissue. A tissue more plastic than the others, its flow is through appointed channels, bearing with it cells consisting of red and white corpuscles, the former of which, as they move along with the current, have the power of renewing oxygen in the other tissues, while the latter, known as leucocytes, or wandering cells, with distinct power of motion, can become saprophytes, or cells acting as the scavengers of the circulation.

From the cradle to the grave there is no absolute resting-stage of life, whether in the single cell or in the organism as a

whole. Life is acting and being reacted upon by complex influences from the earth, earthy, and from far beyond, by those derived from sun and moon, upon which the earth itself depends. The body, through its tissues, composed of cells, is ceaselessly wasted and repaired, as the fundamental condition of temporary endurance in the struggle to which every organic being finally succumbs through the law of death. It will therefore be perceived what bearing these remarks have on the laws of life as the condition precedent of health; that is, unless we are so situated, by circumstances of climate and other surrounding conditions, and at the same time obey the laws of life, we cannot, no matter what the strength of the original organism, enjoy health.

We examine our canceled checks, add to them ones still outstanding, and, by comparison of the sum-total with our deposits in bank, carefully cast the balance to find out what still stands to our credit there. But in life, even in robust health, how many carefully reckon up the income and outgo to ascertain what is the balance of endurance left? So far are most reasonable creatures from following such a course, it is generally enough for man or woman to be robust for them to consider their capital unlimited. Pleasure, vanity, and a thousand other frivolous motives induce us to spend lavishly of the greatest of all treasures. The old woman in the fairy tale, with her mumbling jaws and rheum-streaming eyes, was eager to exchange all her riches for the poor girl's blooming cheeks and rounded form, and not less eager was the maiden, in ignorance of the value of her priceless possessions, to seal the bargain on the spot. But, the mutual transfer made, how immediately the maiden saw, from her withered, living grave, that all the riches of the earth cannot compensate for the joy that wells in the heart of youth, health, and beauty.

Youth ought to mean health; more's the pity that it does not always mean it. In the nature of things, we grant, youth

cannot always mean it, for poverty, climate, inheritance from selfishness, which should never have left offspring, are common. Even in human selfishness is an ineradicable cause of the wretched lot of many human beings. But to the readily preventable causes of ill health we may be permitted to refer those arising from unhygienic practices and habits of life; the reckless squandering of vitality, because the capital seems unlimited; the deliberate shutting of the eyes to overdraft on vitality for temporary gratification, whether from vanity, love of gayety, pleasures of the table, artificial stimulation, or sexual excess.

It is astonishing to a physician to observe for what apparently slight motives persons will sacrifice their health. We knew of the case of one man, who had been noted as a great walker. Signs of unmistakable decadence, brought about by addiction to this exercise in excess, otherwise most laudable, were apparent to the most casual observer. Probably the signs were evident to him also, but he did not impute them to, or he closed his eyes to, their real source. Exercise, in the abstract, being indisputably beneficial, he would continue to exercise inordinately. Nature soon eliminated him by death. Some persons said, "How strange; he was such an athlete!" Yet he died, when he died, because he was such an athlete. His particular constitution at the stage which he had reached could not stand the strain upon it of further athleticism.

Rational exercise relates to the constitution of the individual and the surrounding conditions. The strength of a constitution can be determined by an examination by a competent physician. Every intelligent person, however, ought to be able, for himself, to reach conclusions in the main correct as to his own stamina, but as every intelligent person does not reach those conclusions, and, in fact, very rarely does, we must conclude that the intelligence is generally blinded by pride, or vanity, or some other cause. We remember saying, several years ago, with reference

to a college notable then and now for its prominence in athletic sports, that it was extraordinary the Faculty of the college did not make it an imperative rule that none of its students should take part in athletic sports, in which a final contest was contemplated, without first of all being subjected to the most rigid physical examination. At that time students came on the scene, chosen by their fellow-students, simply with regard to muscular development, without the slightest reference to stamina. Young men who could not swim were actually allowed to take part in aquatic contests, occupying the cockle-shell of a contrivance represented by the modern race-boat. All this is changed now in that college, but the change should have been made long previously, or rather a change should not have been requisite, for from the first the rule should have been mandatory, that a physical examination should settle the admission or exclusion of any collegian in the sports which require a course of severe physical training and final supreme effort. Only lately, in a collegiate race, every man in the defeated crew succumbed to exhaustion, and was put to bed, some of them in sorry enough plight. On Lake Saratoga we once saw a man faint in his boat from sheer exhaustion, a man whom we, from his mere appearance, should at a glance have excluded as incapable of severe physical strain, while in another boat, not far off, the whole crew, in mid-lake, was thrown into confusion by a similar scene.

We might go on indefinitely, multiplying instances to prove how little regard is paid by the majority of persons to the question whether a man is by constitution fit to withstand the drain requisite for great muscular development, and the final intense nervous tension of the contest for supremacy. The man lives not so strong that he may not be overtrained and constitutionally impaired, from which it follows that, for a given feat, the selection should be most rigid and exclusive, especially for college students. What is feasible, too, at one time

of life is not feasible at another. Did any one ever consider why it is that Cornell must of necessity defeat other colleges in the United States in boat-racing, and why it is that she has been rigidly excluded from most competitions? Galton shows us plainly in his work on "Hereditary Genius," where he proves the transmission of mental traits, that even muscle for particular kinds of exercise is inherited, the boatmen on the Thames being generally the descendants, through a long ancestry, of other boatmen. The men of Cornell are not generally the descendants of boatmen, that is true, but the class to which many belonged, at least when Yale, upon being defeated by her, decided against further competition with "country colleges," were the inheritors of muscle, for many of them were men who had worked at trades, and had been thereby enabled to take a college course as the fruit of their previous exertions. Not only were many of them thus muscularly descended, but the circumstance to which we have just referred brought it about that the age of very many was greater than that of an equal number of persons at other colleges. Now, as the fact is anatomically established that a man is not fully formed in all parts until 25 years of age, it is easy to see that the advantages of Cornell were then, with anything like an equal number of students to select from, much greater for a racing contest than are those of any other college in the country. As between Oxford and Cambridge the contests are about equal, and for the reason that, while the range of selection is numerically about the same, the class of men is also about the same. As between Yale and Harvard the rowing contests are not exactly equal, and for a corresponding reason, that, although numerically the students are about the same, the class of students, if regarded as a whole, varies slightly.

The imprudences in exercise to which we have referred do not cease with men. A few years ago it became the practice in

some parts of the country for young girls to take long walks. It was so English, you know. Besides, every one who is or has been young knows how fascinating it is to take long walks with an agreeable partner of the opposite sex. The trees wave, the shadows fall, the blossoms peep in the spring, or the nuts rustle through the twigs in the autumn, all the more pleasantly for the chat and rippling laughter of a congenial partner in the ramble. But, these being constitutional walks, duty must not be forgotten, although pleasure be allowed full sway. And so, even girls at the tender, turning age, when they should be so physically discreet, would often plod weary miles in this climate, which, however patriotic we may be, we are not bound to hold as particularly suitable, except during a very brief term in spring and autumn, for long pedestrian courses. It was a fad, an inviting fad, that led in some cases which came under our observation to distinctly enfeebled health and constitutional impairment. The skating mania among young girls, especially as exhibited in closed rinks, was even worse in its effects on health, by the immensely larger proportion of the infatuated who were the victims of it.

The present evil in the same direction is lawn-tennis, but that can never become so prevalent. It also solicits the free and joyous intercourse of the two sexes in the open air, and is therefore doubly seductive. We have nothing to say against it as a most innocent and exhilarating sport, nothing to say against any innocent diversion in moderation. But, just as in England, where, from being an essentially amateur game, amateurs came to play it with almost professional skill, so here has emulation led many a girl to exercise far more than was for her good. Would that youth could learn some of the wisdom of years, that the possibilities of pleasure flee from excess. Ah, "*si la jeunesse savait, si la vieillesse pouvait*,"—if youth had but discretion and age were but capable!

But the physical overdoing of things by members of either sex is not the only cause, among otherwise innocent things, of depressed vitality. We have known many cases where half-formed youth have racked their brains and shattered their nervous systems by overstudy at a time of life when a better alternative would have been to saunter along through life picking cowslips by the streamlet's brink. But no such single alternative lies in the situation, for the true alternative is moderation,—moderation, the guiding star of the wise, which even some of the ancients followed as a beacon through life. We were once acquainted with a young man who must needs know more Greek than the capacity of man can properly receive within a brief college course. The college where he was a student, although one of the first in the land, one capable of imparting as much Greek to a man as he could well stagger under through life, was not good enough because not Greek enough for him, for in another college there was more Greek, and at the end of the vista a splendid prize to be obtained by passing the highest examination in the language. He left his college and enrolled himself at the other, and studied harder and harder as the fateful time approached. The last part of his study was in bouts of eighteen hours a day, with wet cloths bound about his head. He won the prize, but what became of the man? We met him upon his return, crushed under the spoils of victory. He asked our advice as to his condition of health. We said: "Return to your mother, Earth. There is meaning in the old classical legend where it describes Antæus, son of Earth, striving with Hercules, and renewing his strength every time his foot touched the soil, until Hercules mastered him at last by raising him aloft and squeezing him to death in his embrace." We said to him: "Return to the bosom of your mother, Earth; she will restore you if it be possible." We went with him for a few days, saw him revive under the influence of her balmy breath, and his

spirits and love of life return. Then we were obliged to leave him, and since we know nothing of his existence, whether he be alive or dead. But if there was a chance for him, we pointed it out when we bade him return to the bosom of the kindly mother from whom he had so widely departed.

Another case we knew, of a young man of decided mathematical and astronomical talent, who, because he had such exceptional gifts, was stimulated to the top of his bent to climb to the highest range of acquisition. Him, too, we saw at the end of a long course of superlative effort bowed like an old man, plodding listlessly along, evidently far removed from interest in life, perhaps, as he seemed, even weary of it. Some of the great monuments of Greece, although in ruins, still attest her ancient grandeur, and with the best of her literature still survive, and the stars pursue their courses as they have rolled since the creation of the universe. But what advantageth it them, the world, or the universe that a man should wreck his mortal frame in Greek and astronomical lore in seeking to reach empyrean heights? What accrued to these two poor young men, to whose cases we could add a score, in advantage to themselves or others from such self-sacrifice? The measure of one's self one should take with the measure of accomplishment. This is the plain wisdom for every human being through every act of life.

The celebrated Hufeland, German philosophic physician, instructed all who might read, long before the days of the wondrous modern advance in physiological knowledge, that life in the individual varies in intenseness, that its existence and duration depend on draught upon it. The life of the old and feeble is a faint flame that burns steadily low. Trim and stimulate too much the wick, represented by the failing body, and the flame flashes up for a moment and then expires. But, no matter what the strength of the individual, the same underlying law obtains through the fact that everywhere, at all times, the body

has relation to amount of exercise of function in its environment. Take the very strongest in brain or muscle, and exercise these unduly, or in undue relation to each other, and the vital flame burns lower and lower until it may be snuffed out with a breath. What is rest cure? The discovery of a modern physician? Not at all. It is born of the instinctive knowledge of every mortal wearied in body or mind. What is camp cure? Is it the discovery of the same physician? Not at all. It is at bottom the instinctively self-prescribed cure by the physically depressed, yearning for the pure breath of the fields and heavens.

One of the miracles in this world's strange and unequal disposition of its goods is their partial apportionment among the unappreciative. It would really seem at first as if deprivation were necessary to secure appreciation. The pent-up people of cities long for the landscape and the air to which country people never give a thought. But this is the superficial aspect of this state of things, the truth of which cannot be denied. Below the surface, at the true inwardness of it, lies the fact that deprivation, although, as it always does, stimulating desire, is not the sole or the greater cause of this difference. That lies in the generally higher grade of education in cities raising the mind to greater love of nature as well as of art, through which, in turn, comes greater appreciation of nature itself. Show us the village or little town, or farm-house, however endowed in its surroundings by nature, whose inhabitants generally seek the fields, woods, and hills for the sake of any beautiful prospect. Show us any such place where the wretched pictures on the walls do not betray the possessor's ignorance of nature as seen through art. Is it the eye, through the picture thrown on the retina, that sees? Yes, in a measure, but in far from the larger measure. It is the mind that sees through the agency of the eye as its instrument. Hence, men see so differently, differently according to their original constitution of mind, and differently according to their

cultivation. If some of our country friends, whose homes and habits differ from those herein described, are inclined to think our picture overdrawn of the striking difference exhibited in culture as to nature and art between denizens of the city and those of the country, we say with the poet, if you seek the monument, look around you. If you present happy exemption from the rule, thank heaven that you are not as other countrymen in that regard. But do not flatter yourselves that your happy condition represents the rule. Travel through the length and breadth of the land, as we have, taking in its average farm and country life, and you will find that what we have said is strictly true, that the country generally cares for neither nature nor art.

Here, then, we have presented one of the standing anomalies of civilization, that a great number of persons are constrained to live in cities who love and are capable of appreciating the country, while a large proportion of those living in the country are destitute of the sense of the picturesque. We knew a young girl of 17 years of age, of perfect leisure; idle, one might say, except when in attendance on a fashionable school. Around her village home nature had lavished a profusion of gifts in gray-blue rocks surmounted by foliage, brilliant in summer, and all the more in the glowing autumn, while beyond, at a turn, about a mile away, of the rock-parapeted road that led from the home in which she had been born and reared, broke the glorious sea with its everlasting roar. Yet she had never, as she mentioned, unconscious of its strangeness, been even as far as that inviting turn in the road, in plain view from the porch of her father's house. The peculiarity of the case does not lie in its isolation, for we have met multitudes of such cases, differing not at all in kind, but solely in degree.

Here is a contrast, indeed, between the city maiden, who would love to roam, if it were ever safe, on the outskirts of her

city, and the average country girl, who habitually shrinks from the exercise of walking, and cares not a straw for scenery. Could we transplant them it would certainly be well. We do, in a measure, transplant one, as the yearly exodus to the country shows. But here the city-bred meet a difficulty hard to understand in a rich and luxuriant land. In real country living the barbaric stage of fried cooking is, for the most part, found. One cannot live on view alone; the mind refuses to lend itself to the highest æsthetic enjoyment while the body grumbles for the lost flesh-pots of Egypt. An Irish servitor of ours, who accompanied us on one of our tours, put it neatly when he said one day to the hostess of our temporary lodging, "Ach, indade, ye may talk about your fresh country vigetables and milk and crame, but I find they come in the city much better to the gate!"

Where, too, is to be found the freshest air and brightest light, there they are the most rigidly excluded. Who does not know the stuffy, darkened rooms of the ordinary farm-house, the subtle smell in the chambers of the painted window-shades, and of the long-plucked feathers in the pudding bed; the sitting-room with its single ray of light, sparing the colors of the carpet, by which one navigates toward a book; and the one room devoted to refreshments, where alone are light and air, and flies hold high revelry? This is no fancy sketch of multitudes of farm-houses we have visited. We have ridden day after day amid mountains, with knapsack strapped behind the saddle and rifle resting athwart the pommel, dismounting to catch trout or to draw a bead upon some startled deer. At night-fall we have, with our companions, hobbled the horses to allow them to graze with restricted liberty, and then, becoming a cook for the nonce, have helped prepare viands in the style of Homer's heroes. Then we have retired to our blankets with a profound sense of comfort not experienced in many a farm-house. There was at

least fresh air. Oh, what a boon is fresh air! And the sunshine, perhaps, would greet us in the morning. What healing there is in these two ministers to life! This is a savagery, but it is the sweetest phase of savagery; savagery without its famines and its baleful passions; savagery with the sweetness of the earth around, under the pure canopy of heaven with its twinkling stars. It is the kind of savagery that only the highest civilization can thoroughly enjoy. Compared with the barbarousness or the semi-civilization of life which shuts out by the walls of a house what seeks entrance as some of the kindest gifts of heaven, it is luxury. Digestion waits on appetite; the whole physical and mental being is exalted and in touch with something higher than ordinary life.

In cities the knowledge of hygienic living is far greater than in the country. Despite the unfavorable surroundings for health, which make the death-rate in cities much larger than in the country, the checks are greater there against disease and death. The city collects within its boundaries the ablest physicians of the land; even poverty proves no bar to receiving the best medical treatment; general sanitary knowledge among the educated is quite high; the municipality sees to the drainage and other salutary measures; it guards against ignorance, carelessness, or recklessness, by demanding for the public good that no one shall maintain an unhealthful nuisance; even neighbor is watchful over neighbor for his own and the public weal, that every noxious condition or practice that may lead to disease or pest shall be removed. Undoubtedly there is still room for much improvement, and great improvement is being constantly made through increase of general knowledge of sanitary laws. The city's chief fault, at the present time of its generally rapid growth in this country, is in not efficiently guarding against dumping of improper matter in the process of filling and grading at its extreme limits. Yet we cannot but admit, at the

same time, that with such a periphery as many a city has, moderately policed as all our cities are, the guardians of the law must needs be Argus-eyed and nearly ubiquitous, always to prevent the nuisance of improper dumping, especially as much of it is stealthily done after night-fall. When, therefore, we consider the intrinsic difficulties which a city encounters, from the nature of the case, in enforcing sanitary conditions, and the comparative ease with which they could be reached in the country, the difference in sanitary knowledge and practice as between city and country is amazing.

We think that we have shown, although briefly, without unduly entering into details, that in both city and country the ills which flesh is reputed to be heir to might be largely abated if people generally were more conversant with the laws of life, as to air, light, warmth, and exercise. There are, however, many other points as to these laws upon which we shall have occasion to touch when we come to detailed instruction in reference to them in the following pages. The moral of what has heretofore been remarked is that the law of life, which is fundamentally that of health, is that the tissues of the body, down to the ultimate cells of which they are composed, shall freely bathe in oxygen, and the organism reject the carbonic acid which represents its poisonous waste. Fresh, highly oxygenated air, is not merely the breath of the nostrils; the nostrils are but the channels for conveying it to the tissues. The organism craves oxygen in every tissue, craves the actinic or chemical rays of the sun, and light and warmth. It demands in moderation exercise of function, because, however admirably parts were originally endowed, they cease, from neglect or disuse, to preserve their pristine integrity. And so complex and correlated is the mechanism of the system that one part cannot be deranged without injuriously affecting others in an ever-widening circle. Not less would we seek to impress upon

the reader the fact that through the influence of mind upon body health is concerned in the education and excitation of the spiritual part of being, through all influences, including nature and art, which raise the mind above the sordid cares of life. It is, in fine, through the deployment in moderation of all the faculties of mind and body that they receive the strength and equipoise which represent perfect being.

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CHAPTER II.

THE REGULATIVE LAW OF LIFE AND GROWTH.

IT is indispensable, for realizing the significance of natural laws relating to health and beauty, that one should first of all understand the regulative law of all life, that which makes any manifestation of life what it is at any stage, makes all living things, mankind included, what they are,—the law of evolution. It will therefore be necessary, before proceeding further, to give the true interpretation of this law, which is not only popularly misunderstood, but, despite all the discussion of it by scientific men, is as to some points often misconceived and misstated in quarters otherwise marked by intelligence and education. Why this should be so is not easily solved, unless it may be ascribed to the circumstance that very many persons have not examined at first-hand the works which have striven to demonstrate the existence of the law, but have received at second-hand the interpretations, adverse criticisms, and ridicule of it engendered in the heat of controversy. Certain it is, however, that although the most prominent modern enunciation of the law was at first received, save by a very few, with unbounded dissent, some of its stanchest scientific opponents were gradually won over to a recognition of it, which now includes, almost without exception, save as to details, the whole generation of scientific men which has arisen since its most remarkable modern affirmation.

But it is not, at least at first, intended to speak here as to the truth or falsity of the alleged law. We will therefore revert to the point of popular misinterpretation of its meaning, as stated. In brief, divested of all that is extraneous, the popular notion of this alleged law, as advocated by Darwin, is that man originates from a monkey. Charles Lamb, it will be remembered,

spoke in fun, without a thought of anything else, of monkeys as his poor relations. That is, however, we believe, the strictly average popular notion of Darwin's scientific conception, with not a particle of fun about it, but in sober, serious earnest. Beyond that strictly popular view, through varying degrees of misinformation, we find a large amount of what Darwin wrote, either misinterpreted or else so inadequately stated as to give the falsest of impressions. This is not matter for great surprise to any one who has observed among mankind the tendency to seek the lines of least resistance, the saving of trouble, by adopting at second-hand opinions which can be obtained at first-hand only by labor. There is, however, to our knowledge one extremely surprising source of misinformation. The "Encyclopædia Britannica" stands pre-eminent among works of its kind as embodying the most learned and thorough information on all important subjects. But, notwithstanding this, the reference to Darwin, under the article "Lamarck," is most misleading. The author of the article says :—

It is therefore only the sufficiency of the Lamarckian hypothesis to explain the first commencement of new organs which is in question, if evolution by the mere operation of forces acting in the inorganic world be granted; and surely the Darwinian theory is equally helpless to account for the beginnings of a new organ, while it demands as imperatively that every stage in the assumed hereditary development of an organ must have been useful.

Just preceding that statement the author had remarked :—

Thus, for example, neither theory considers that it has to deal, not with crude heaps of functional organs, but with exquisitely orderly forms, nor accounts for the symmetrical first appearance of parts or for sex; nor, though Lamarck tried hard, has he or any later writer reduced to physical law the rise of consciousness in association with structures which in their physical relations are mere mechanisms capable of reflex actions.

But, as generally understood, Lamarck's theory assumes that structure may make its beginning through need and correspondent reflex action simulating desire; whereas Darwin's theory assumes no such thing, but that the structure, however rudimentary, already exists. He illustrates his idea in one place

by citing the case of the eye, which in its simplest form is merely a nerve surrounded by pigment-cells and covered with translucent skin, but without any other apparatus, lens or anything else; so that, in consequence, it is capable of perceiving light, but not form. Thus it is hardly fair to speak of Darwin's theory as being helpless to account for a thing for which it does not attempt to account, but expressly assumes in all cases to exist as the condition of modification. Neither does Darwin speak of, nor have in mind, "crude heaps of functional organs," but, as the preceding citation shows, structures that are orderly, however low in the scale of being; structures that, whether high or low in the scale, are susceptible of differentiation, which might, indeed, be retrogressive instead of progressive. Variability, dependent upon external conditions, the capacity of change, is always affirmed by him, and that implies the existence of the thing which can change. And so far is it from being correct to say that he (for of course he is included under the expression, "nor, though Lamarck tried hard, has he or any *later writer*") does not try to account for the manner in which sex may have arisen, besides the pointing of a number of his remarks in that direction, Darwin explicitly says, in "The Descent of Man":—

In the dim obscurity of the past we can see that the early progenitor of all the vertebrata must have been an aquatic animal, provided with branchiæ, with the two sexes united in the same individual, and with the most important organs of the body (such as the brain and heart) imperfectly or not at all developed.

Finally, as to consciousness, Darwin assumes, as most men do, that it is probably, in however dim a degree sometimes, co-extensive with animal life. Some of the Neo-Lamarckians, the disciples of the new school of Lamarck, now hold that there is consciousness in the simplest animal protoplasmic forms, and in truth, while watching the movements of infusoria through the microscope, it is difficult to deny them the attribute of consciousness as interpreted through movement apparently with purpose. Darwin seems to assume the existence of consciousness in at

least very low animal organisms, and in one of its two highest manifestations, as conscience, he discusses it in the following passage in "The Descent of Man." He says :—

The moral nature of man has reached its present standard partly through the advancement of his reasoning powers and consequently of a just public opinion, but especially from his sympathies having been rendered more tender and widely diffused through the effects of habit, example, instruction, and reflection. It is not improbable that after long practice virtuous tendencies may be inherited. With the more civilized races the conviction of the existence of an all-seeing Deity has had a potent influence on the advance of morality. Ultimately man does not accept the praise and blame of his fellows as his sole guide, though few escape this influence; but his habitual convictions, controlled by reason, afford him the safest rule. His conscience then becomes the chief judge and monitor. Nevertheless, the first foundation or origin of the moral sense lies in the social instincts, including sympathy; and these instincts no doubt were primarily gained, as in the case of the lower animals, through natural selection.

It is quite pertinent to the above remarks to add an expression of Darwin's own. He says :—

Great is the power of steady misrepresentation; but the history of science shows that, fortunately, this power does not long endure.

But, upon turning to the name of the author of the article in question on Lamarck, which incidentally does such scant justice to Darwin's views as represented by himself, we find it to be that of a Scotch professor, and the reader need hardly be reminded that many Scotchmen not only "jock wi difficoolty," but find it hard to receive new ideas without the surgical interference of which Sydney Smith spoke.

In the popular notion of Darwin's belief there are several implied errors: 1. That Darwin was the first person to conceive and formulate the theory of evolution. 2. That he confined himself to the derivation of man from some lower form. 3. That the form from which he believed man to be derived was some ape or monkey, as we now know those animals. It is therefore desirable here to notice these points in the order in which they are named.

Aristotle, who lived nearly four centuries before the beginning of the Christian era, left certain speculations on the subject

of modification in descent of organized animal forms, crude in conception, but clearly indicating the idea that animals might descend from each other in a series of gradual modifications. Coming down to modern times, the same idea, although having doubtless occurred to many men in the interval, first permanently emerges from obscurity in the writings of the celebrated Buffon, who was born in 1707 and died in 1788. Erasmus Darwin, the grandfather of Charles Darwin, the man whose views we have here under consideration, was the next prominent writer on the subject between 1794 and 1796. The statement by him of these particular views, however, in a book which was noted for its extravagance, led to no impression at the time. It was not until the writings of the distinguished Frenchman, Lamarck, appeared, between the years 1801 and 1815, that real interest was for the first time awakened to the subject. From that time to the present the question has hardly been allowed to slumber. Geoffroy St. Hilaire published in 1828 a modified view of the doctrine of evolution, recognizing previous instability of living forms, but hesitating to believe that they are still unstable, and in 1851 he again resumed the subject with greater boldness in the affirmation of his conclusions. Several distinguished names then intervene, too numerous, although really few, for mention in a work like this, and then we come upon the names of Darwin and Wallace, suddenly appearing upon the scene of this discussion. Both were known as distinguished naturalists, but now, in 1859, they first appear before the world as identified with the discussions on the subject of which we are speaking. Their conjunction and following career, in which their work touched at so many points, is so remarkable that it deserves passing notice.

Darwin had been the naturalist of the British ship "Beagle," in its celebrated voyage around the world, and for a little over twenty years after his return had been collecting evidence in favor of his theory, when Wallace, who was studying the fauna

and flora of the Malay archipelago, suddenly sent him a paper containing an expression of the same views which he himself entertained, requesting him to forward it to Sir Charles Lyell, the geologist. Here was an extraordinary complication. Had not the persons concerned been high-minded men, the situation might have led to most disagreeable consequences. Luckily, Sir Charles Lyell and Dr. Hooker, the naturalist, both knew of Darwin's labors in the direction in which Wallace was unintentionally anticipating him in apparent priority of demonstration. As the result of consultation between these wise friends of the two parties most interested, the conclusion was reached and carried into effect, of publishing, with Wallace's memoir, in the *Linnæan Journal*, extracts from the manuscript which Darwin had been laboriously preparing as the result of his experiments and one absorbing thought for years. After that period, these two men stood almost side by side in the ensuing contest, differing in particulars, but in complete accord as to generals.

Darwin's work, "The Descent of Man," following that entitled "The Origin of Species," appeared first in 1871. He said in the Introduction :—

The conclusion that man is the co-descendant with other species of some ancient, lower, and extinct form is not in any degree new. Lamarck long ago came to this conclusion, which has been lately maintained by several eminent naturalists and philosophers; for instance, Wallace, Huxley, Lyell, Vogt, Lubbock, Büchner, Rolle, etc., and especially Hæckel.

He himself had thought so years before, long before his work, "The Origin of Species," had appeared, for therein is plainly involved that what, in his estimation, applies to the lowest animals, must apply to the highest one of all; and besides, in that work, "The Origin of Species," he had unequivocally directed the reader's attention to this inevitable conclusion from his expressed views there as to the lower animals and plants, by remarking that, by the present work, "light would be thrown on the origin of man and his history."

The theory of evolution was, therefore, not first conceived by Darwin, he himself expressly disclaiming any such pretension. In his work, "The Origin of Species," he did not broach the theory of evolution except as, by the incidental phrase just quoted, including man. It was, with that single exception, devoted wholly to the question of modification by descent among the lower animals. Impliedly, however, as has been admitted, it throughout included man, and in the passage just quoted it expressly included man. But it was not until his much later work, "The Descent of Man," that Darwin devoted himself to the consideration of man's evolution, all the wealth of illustration therein contained confessedly centring on that attempted demonstration. It only remains to add that, throughout his works, he never indicates that man is derived from one of the existing types of apes or monkeys. On the contrary, he expressly denies it, as expressly stating that he believes that man and some one of the present existing species of anthropoid apes are linked together by a remote common progenitor, from which they have widely diverged in traits.

The various grosser errors of statement regarding Darwin's views having thus been corrected, we can proceed to the consideration of the lesser ones, gradually approaching and finally reaching a clear view of the kernel of the matter as to what Darwin really believed and taught.

In point of fact, the whole tenor of "The Origin of Species" and "The Descent of Man" proves that, if anything, Darwin was less assertive as to the existence of the law of evolution than as to the evidence of the modes by which evolution could be effected through certain natural processes. Of course the two contentions must needs go hand-in-hand, but what is meant to be indicated is what has been acknowledged by himself, that he could not claim priority over all the world in the discovery, or the alleged discovery, if the reader will, of the law of evolution,

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but that he could claim priority in the perception of processes by which the effect is rendered possible. Does not every one know what a barrier to investigation of the unknown is previous conception of impossibility? Given that processes were shown by which it could be conceived that forms might be made capable of divergence, and then men were led to look into the evidence as to the degree of divergence, assuming for the first time that sequence and degree of divergence might have, conjointly, a history to tell. Whereas, if some plausible method had not been assigned by which men generally could conceive that successive modifications had taken place, they might have gone on till doomsday asserting that nature, whether living or fossil, had no mystery of life to tell that was worth the unraveling.

Darwin chiefly devoted himself to the establishment of the existence of an agency which he termed "natural selection." The consequence of the operation of this agency was described by the term which he afterward adopted from Herbert Spencer,— "the survival of the fittest." These statements of the action and result of the working of the alleged law of evolution constitute the points of departure for the lesser misinterpretation of Darwin's views to which reference has been made.

Proceeding now on this higher plane, still profoundly in error, it is first of all to be remarked that the popular notion as to Darwin's belief is that natural selection works principally through what scientific men call cataclysm,—that is, violent changes in exterior nature,—instead of through slow processes of change in exterior nature. That, to begin with, is not correct, as representing his views. He makes change in climate a factor in his supposed agencies, but not sudden change, even if we include in the change the coming on of the glacial period. The principal factors by which he accounts for divergence among animals are : Changes in continental and insular areas, produced

by the slow upheaval and subsidence of portions of the earth, with consequent changes in climate; pressure of animal life, through natural increase, upon the means of subsistence, leading in the struggle for existence to many consequences, such as extirpation of the less hardy and modification of the offspring in the remaining *élite*; migration to new regions, involving new external conditions and the indirect contest for subsistence with other species.

But Darwin, in accounting for change in species, did not rely solely upon the agencies especially designated by the term "natural selection," but included another agency coming within the sphere of natural selection, but distinguished from it by the term "sexual selection." The agencies, in sum, upon which he relied as competent to effect change in species are natural selection (by which comes change of structure through new external conditions), artificial selection (by which man modifies the lower animals), sexual selection (by which minor attributes are acquired), compensation of growth (by which vital growth, expending itself in one direction, is lessened or discontinued in another), reversion to primitive details of structure (through what is now called atavism), protective acquirement of similarity (called, for brevity's sake, mimicry), and food. So, it will be observed that Darwin summoned a number of agencies, agencies within the fullest idea of natural selection, to account for variability of species.

Continuing to rise to a still higher plane above the grossest of the errors regarding Darwin's belief, which are now corrected, we find that, among even educated people, the term "survival of the fittest" is often misconstrued. It does not, as largely interpreted, mean the survival of those forms which, in the estimation of any one or a number of persons, have an inherent right, morally or otherwise, to survive, to be worthy of continued existence; but simply the survival of those which, either from constitution or from plasticity in adapting themselves to new

conditions, are enabled, under those conditions, to survive. The expression, "survival of the fittest," in a word, relates simply to ability, in the general environment, of the individual to survive. If an arctic rigor were to cover an insular expanse from which the lower animals necessarily could not escape, and these animals had been habituated to a warm climate, they would undoubtedly be all destroyed by cold. If, on the other hand, the cold were less rigorous, some might survive. If, instead of the place being an island it were on the main land, many would die during migration, but very many also would survive. The same thing would apply to human life subjected to similar change, although in that case men, as organized by civilization, would not suffer as would insular savages, who would be utterly swept away. The loss of human life would be deplorable before any alleviation could occur, but large bodies of the inhabitants of a civilized country, whether insular or not, would successfully migrate to other regions. It is easy to see from this simple illustration how many unworthy, from some points of view, of living would continue to survive, while many, from the same points of view, most worthy of living would certainly perish. Nor does the law cease to be operative with the physical world. Daily events prove, to every one who reads and sees and knows the world, that, even in the social life of man, given certain deficiencies of character and training, and that the environment shall suddenly become seductive and full of snares and pit-falls for the ignorant and unwary of danger, and the majority of mankind go down and are swept out of existence as by a fiery besom of destruction.

Rising still one more step to consideration of the least flagrant of the errors as to the Darwinian theory, and, therefore, to the last to be noticed, it should be mentioned that evolution is not, as is often believed, intended to express necessarily an advance. Understanding that it may represent a retrogression

in particular cases is necessary to a full comprehension of the meaning of the expression, "the survival of the fittest." The expression implies, in the first place, that there has been a change, and, in the second place, that the change has imposed stress upon the forms of life subjected to it. This being so, how is the idea reconcilable with it, that evolution always means, in every case, progression to a higher type? The supposed change may, in a given area, even destroy everything except that which is representative of an inferior type. The change, on the other hand, may be simply unfavorable to one or more forms of life. Cope has lately shown, through comparison of the fossil remains of certain batrachians (frogs) with living species, that the ear of one species has, instead of improving, retrograded; in conformity, of course, with the later conditions under which the animal has lived.

Change, in fine, may be favorable or unfavorable, and therefore there may or may not be progress to higher types of organs or of beings. The meaning of the term "survival of the fittest" does not teach that there is always necessarily progress at all times and places. That which is otherwise taught is that, regarding the scheme of nature as a whole, the progress of rise in type is manifest and enormous. It teaches that, at times, there has been and is retrogression. It is believed, upon good evidence, that there are now savage tribes which represent people which were once not so savage. Some of the great peoples who once inhabited portions of the earth have left in those same regions degenerate descendants. If we are not to believe this, contemplate the alternatives. They either all migrated or they left no offspring. Which is the most likely of the three propositions?

Having now, as briefly as possible, corrected the various prevalent errors regarding Darwin's theory, first by statement of what it is not and then by definition of what it is, it naturally remains to add some of the evidence upon which Darwin

bases his conclusions. The merest fragmentary outline must suffice for this, seeing that he wrote whole books on the subject; that, as he was an able man, it is presumable he did not write more than was needful; and, finally, that, whether he did or not, we cannot take the benefit of his whole work. But, sketchy as the outline must necessarily be, it will be sufficient to afford the reader an idea of the cogency of the evidence by which he supports his theory, and of the entire relevancy of the topic to the questions of health and beauty. Health and beauty are both involved in the law, and the reader will perceive, as we proceed, that its agency is not overstated at the beginning of this chapter, where it was designated as the regulative law of life and growth. For, let it now be incidentally remarked that nothing which we see around us but has been gradually evolved, the inorganic as well as the organic world. Races, nations, societies, individuals, however rated and classed at any period, are but evolutionary products. Even man in his present most highly organized aspect is not the sole arbiter of his destiny. All present social conditions, including government itself, have risen from mere tribal affiliations, and are still subject to the fluctuation, to the rise or downfall, which the previous history of the world has shown. The destiny of every living creature is, at every instant of time, partly within and partly beyond its control.

Take, for instance, the moral world. The individual in a community is but a unit. If he, in any degree, molds to his wishes the community in which he lives, much more it has molded and continues to mold and control him. Could he, morally or intellectually, rise to sublime heights above the community, the fact would be beyond appreciation. Does he, either morally or intellectually, descend too far below the generally established plane, the conduct which his thought shapes makes society intolerant of him. Only upon the condition that he shall not rise too high above nor fall too far below the general sphere

of sympathy can he influence or be influenced by his fellows within any social bounds. And thus it has been from the beginning, and must continue to be, so long as men are men, having the mental and moral traits by which we know them now as belonging to mankind.

Does any one suppose that the present high estate to which individual men and women, and some large aggregates of them, have risen in various portions of the earth was reached at a bound? Within historical times we know that it has not been so, and the evidence beyond them, exhumed from the earth, proves that it could never have been otherwise in prehistoric times, through all geological change, since man first became a denizen of this sphere. A savage he was, and a savage he remains, in many respects, yet; but an unmitigated savage he originally was, and universally was, and is not now. All that we see so admirable now in him is the result of an evolution, advancing, retarded, checked, progressing, passing through endless vicissitudes, until we find him now touching, in some races, upon the low intelligence and aspect of the brute, and elsewhere so glorious as to awaken the hope that his final earthly development may transcend our most fervent aspirations.

CHAPTER III.

NATURE'S EVIDENCE OF THE LAW OF LIFE AND GROWTH.

THE preamble constituting the last chapter was necessary, lest the reader might not realize the intimate relation which the law of development bears to every passing incident of life. The evidence adduced by Darwin, Wallace, Spencer, and many others, in support of the alleged existence of the law, resolves itself in a general way into the categories of former geological change and the comparison of living with extinct forms of life, as known through living creatures and fossil remains. This chapter will be especially devoted to exhibiting some of the evidence upon which the existence of the alleged law rests, coupled with such manifestly implied considerations as to the importance of its recognition in the conduct of daily life as will obviate the necessity of their formal presentation.

All the varieties of what we call fancy-pigeons—carriers, tumblers, pouters, fan-tails, turbits, and others—are derived from the rock-pigeon, which is blue with black-barred wings. This has been proved by breeding those pigeons together in such a manner as to produce partial reversion to the assumed parent stock.

The results of the breeding of domesticated animals show that horses, cattle, sheep, and dogs can be so changed within their kind as to be hardly recognizable as derived from the animals which formed the point of departure. The same thing holds good of plants. The effect described is manifestly accomplished through artificial selection, as distinguished from natural selection, but this throws great light upon the question of natural selection. Artificial selection itself is naturally divided into two classes,—conscious and unconscious.

The selection is unconscious when, as often happens, a

person, not a breeder of animals or a cultivator of plants, effects a change by selection in either, without any remote ulterior object. Putting, for the sake of simplicity, plants out of consideration, and confining ourselves, as heretofore, to animals, the case referred to is illustrated by the occasional action of a person breeding, for the assumed improvement of certain qualities, from a pair of individuals which happen to please him by their traits. The selection, on the contrary, is conscious when, as with skilled breeders, generation after generation of animals is bred for the finest points of physical and mental traits, representing generally useful qualities. Speed is thus developed in horses, milk-giving or butter-making qualities in cows, hunting qualities in some dogs, size and ferocity in others, speed or household qualities in others; the qualities in some of these latter being not at all useful, but fanciful, as are the peculiarities of the French poodle, the King Charles spaniel, and the pug. But, whether the quality be useful or useless, it is proved that any amount of divergence is seemingly producible from the parent stock. This pursuit, even during an ordinary human life, suffices to produce wonderful changes in domestic animals. When breeders thus, through conscious selection, have pursued the same object,—that is, definite direction toward the object through several successive generations,—the gradually-accumulated differences make at last in the animal under development a transfiguring result. Imagine what could be produced in the way of divergence of animal forms if men had the power and will, through continuous living, to carry on their conscious selection indefinitely. Imagine, then, the effect, if nature has been applying through thousands of years, millions, æons, a rigid selection, through a universal law of growth, life, and death, imposed by the Creator. We see it all around us, in our own persons, and in the whole outlying world. The present is the growth of the past, linked through endless series to the creation.

When a genus, the last bounds within which classification places species, consists of very many species and varieties, it is found that, throughout, the likeness between many forms is very close, and, moreover, that, grouped around special forms, are congeries or clusters of species and varieties, more closely similar to each other than are to each other the species generally of the inclusive genus. This is a very striking fact, awakening suspicion that such species, constituting the genus, have been molded through similarity and dissimilarity of conditions found in an extensive range, and, further, so as to form under continued individual similar and dissimilar conditions, continuously derived varieties, all of which may eventually become true species.

Species which are most abundant in individuals, and at the same time are most widely diffused in a single country, being there what may be properly termed the dominant species, exhibit the most numerous varieties. This phenomenon points in the same direction as that which has just been noticed, and, moreover, confirms its ultimate suggestion to the mind. That is to say, if variation is producible and produced from any cause whatever, we cannot say that the same cause is incapable of producing indefinite change; we cannot say that species may not be produced from varieties, and that the final product in the course of ages may not be quite dissimilar from the stock from which observation has been supposed to begin. Therefore, if natural selection as defined can produce change, it is impossible mentally to limit the amount of change.

There is a singular and surprising relation between the similarities and dissimilarities among animals found on continents and on the neighboring islands, and striking relations among animals inhabiting the islands themselves, pointing to primary differentiation as between the continental and insular forms and secondary differentiation as among the insular forms.

It has been ascertained, too, that in large areas which, there is reason to believe, from geological evidence, have not been subjected to invasion of new forms for many ages, the living and fossil forms make a much closer series than they do in those regions which geological evidence shows to have been open for long periods to the invasion of species. The most marked exemplifications of this circumstance are exhibited by the persistence in Australia of the marsupial (pouched) type of animal, such as the kangaroo, and in South America of the edentata (sloth) type, like the armadillo, ant-eater, and others.

The stripes of the zebra are sometimes suggestively indicated on the horse and the ass. Similarly, spots appear and disappear on certain adult deer, only the young (the fawn) normally exhibiting them at present. These are believed to be cases of partial reversion to primitive characteristics, the common progenitor of the zebra, the horse, and the ass being supposed to have been some striped animal, and that of the deer tribe some spotted and otherwise widely different animal from the present deer.

There is a whole succession of animals graduating off into each other in functional adaptation of the eye, as they graduate in space from light to twilight and then to total darkness, the eye becoming of less and less efficiency and then of none at all,—in structure, only the rudiment of an eye. Is it to be supposed that these animals were separate creations for separate localities, each having been endowed, if it can be so termed, with structures which sometimes have little and sometimes no relation to use,—merely to suggest an idea of symmetry and system in creation? Is it not rather to be supposed that in all of these creatures the shamness of seeing could not be the result of special creation, but that their eyes once exercised more function than the least imperfect of them now? that, in the course of time, loss of function, through changed conditions and habits, led to partial loss of structure? and that the present structures, which,

when otherwise, once served a purpose, might, under changed conditions, serve again the once discontinued purpose?

The blind fish of the Mammoth Cave of Kentucky are the most familiar instance of the rudimentary condition of the eye to which reference has just been made, and crabs there have the foot-stalks for eyes, without the eyes themselves. Rudimentary organs, however, extend over an immense range among living things. The pouch of the marsupial is really the first form by which the breast of land mammals is foreshadowed. In the case of the male sex among mankind, physiologists are agreed that the breast can hardly be regarded as rudimentary, its glands, in certain cases, being known to secrete milk. It is therefore regarded simply as an organ which is no longer normally capable of function. Minute anatomical examination of the body, known as histology, shows that, even in so remarkable a connection as that between the human spine and brain, there is a demonstrable case near the upper vertebræ, where the fibres still exist, but are functionless. In this part, therefore, they have been superseded by other special adaptations, and in the course of ages may become more and more rudimentary, and perhaps finally disappear.

There are upland geese with webbed feet. What possible use can webbed feet now be to these geese? Darwin remarks of the frigate-bird, or man-of-war hawk, as often called in Florida, that it has all its toes webbed, and that no one but Audubon ever saw it alight on the surface of the ocean. We can personally confirm this statement, having watched the beautiful floating of thousands of these birds in their solitary flight through the air, soaring in concentric circles on apparently motionless pinions. It is not uncommon for any bird which obtains food from the water to flutter immediately over the surface, seizing what it can peck up or grasp; and this produces the effect which, doubtless, Audubon perceived when he suspected that the webbed feet of the frigate-bird aided it to support itself upon

the water. The bird is so extremely shy, and keeps at such a distance from man, that, even with a telescope, it would be impossible for any one to say that it uses its webbed feet as support on the surface of the water. Their inefficiency for that purpose is of itself presumption against their existence and use for any such purpose. Observation of what happens in the case of other sea-birds, and, indeed, for that matter, in the case of fresh-water birds, confirms this presumption, and leads to the conclusion that the webbed feet of the frigate-bird, as well as those of the upland goose, represent structure which had been useful in now discontinued habits of life.

The causes which may determine the greater or less persistence of a form, its extinction or its modification through migration and changed climate, food, and habits, are sometimes of a kind beyond the knowledge of the ordinary dweller on the earth. The pest of the tsetse-fly, in the southern part of Africa, is so great, so virulent are their attacks upon cattle, that to save those animals from certain death it has been from time immemorial necessary to cauterize the tail. The circulation near the end of the tail being weak, and the vitality of the part there being in consequence low, the venomous attack of the fly which takes place there leads to rapid sloughing of the tail and the death of the animal. The animals which are saved by the process mentioned are, of course, domestic animals, and therefore have no power of migration independent of their masters. Imagine, however, what might readily take place if they were in a wild state, how many would be destroyed, and how many would remain if nature had not, as it has not, placed impassable barriers to their going.

What kind of a country must that be where the termites, or white ants, make occasional inroads, swarming over the whole of the ground, entering every hut and house, and devouring everything before them, even down to paper? Certainly the conditions of existence there are something frightfully unlike

what most human beings are acquainted with, and involve manifold untold changes besides that exhibited in the visible, swarming ant-life of that region.

What ordinary observer would have supposed that so apparently simple a matter as the introduction of the English sparrow into Philadelphia would affect any other animal life? Yet Dr. Le Conte, the entomologist, who, living in Philadelphia, had ample opportunity of observing, said that before it had been here very long it had so suppressed the particular worm for whose destruction it had been imported, that a certain hairy worm, which had before been scarcely noticed, and which the sparrow would not touch, had multiplied inordinately.

Whether wild or domestic, we find that there are individuals among all animals which have, beyond others, the capacity of resisting hardship. This capacity being often mysteriously associated with color, it comes about, from the death of the less hardy, that the preferred color is that which, as represented by a beast, is the only one left to propagate its kind. Thus even color can come to be associated with constitution, and remain fixed, as representing the constitution best fitted in an individual animal for conditions under which it has been evolved. Color is also markedly associated with the kind of protection which obscurity confers. Observe how protective are the colors of fishes which, through weakness, need protection. The flounder is white on one side, it is true, but observe that that is the side which is toward the bottom. When fishing along various continental coasts one cannot help being struck with this phenomenon. Observe the colors of the hare, the grouse, the partridge, and of many other game animals. Even in form there is often so close a mimicry by animals of inanimate nature as to require the closest scrutiny to distinguish between the living and the not living. The well-known leaf-insect so closely simulates the leaves on which it rests in feeding that the nearest inspection is required

to distinguish it from them. But there is also animal mimicry of animate objects. There are certain species of butterflies which have imitators so close as to require much effort in the open air to distinguish one from another. It has been discovered that the mimicked kind enjoy certain immunities from danger and destruction, in which the mimickers participate. Thus, natural selection finding the two originally alike in their individuals, the likeness intensified through the destruction of those of the mimicking species which were the least conformable to the standard of the protected kind, and thus those which are left to propagate their kind always tend to approach nearer and nearer to that standard.

Color is associated even with traits of character. The white horse is invariably mild in disposition, the black horse fiery. Gray in horses seems to be associated with strength. Color is associated and identified with sex, of which the most familiar instance is the color of the tortoise-shell cat, which is almost invariably female, while the corresponding male is as invariably of a dull brick color.

Not a hundredth part of the phenomena which form the evidence of the existence of the law of development has been given, or would be appropriately introduced here; but surely enough has been said to warrant the assertion that, be it much or little, enough has been adduced to establish the claim to a good standing in court for the probable existence of the law.

Sexual selection, which, as has been intimated, is really within the general sphere of natural selection, although it is distinguished by a different name, is effective through the interaction of the two sexes among all those animals, including man, where individual preference is exercised. It is perfectly well established, that even among some of the lower animals, notably among birds, the sexual instinct is not exhibited save in conjunction with individual preferences. It is hardly necessary to say

that, among mankind, individual preferences are the most manifest of the impulses which draw one sex toward the other. But we will reserve for a future chapter the discussion of the relations of the sexes among mankind in the highest affection, known as love, and confine ourselves here to the effect of the action of sexual selection among the lower animals.

Just as in the spring-time the young man's thoughts, and for that matter the young woman's, turn lightly to thoughts of love, so among all the lower animals there are joyousness, assemblies, the movements of courtship, rivalry, and strife; all growing out of the indefinable attraction of sex to sex. It is the awakening time of all nature, of plant as well as of animal, when the returning sun stirs the pulse of all life, and being, in renewing itself, rejoices.

Fear has been called the strongest of the passions, but surely that view, even if we accept as part evidence the ancient superstitious sacrifice of human life, is not tenable in face of the fact that love conquers fear. Love, we may safely say, is the most potent and widely diffused of all the passions; so potent that it even holds within its chalice all the rest. It holds not only what is most beautiful, but jealousy, envy, hatred, cruelty, all that is most malignant. It is, therefore, the master-passion, which, working mainly for good, yet holds potentially such evil as may assume the guise of either angel or devil. Among the lower animals, to some, but, to only a slight degree constrained by morality, the baser impulses which love has the power to originate find free vent. Stags and most other horned animals gore and trample each other ruthlessly to death. Game-birds fight and pierce and lacerate each other with the most savage satisfaction. We have watched an alligator, fresh from a desperate conflict for some most unlovely loved one, with part of its upper jaw and a foot or more of its tail gone, and both fore-legs broken at the shoulder, so nearly spent that it had barely enough

strength left to push itself slowly forward for a few feet with its hind legs and slump into the water. Darwin, after giving an interesting account of the combats of many species of animals, remarks that he is not aware whether crustaceans fight. We could have told him that duels among crabs are common in the spring-time, and that, when the animals are fighting, they are so much absorbed that then is the easiest time to catch them.

But here let us quit this line of description. It was entered upon solely for the purpose of correcting a very common belief that the loves of most of the lower animals do not awaken evil passions, and briefly to indicate that, for the most part, their courtship includes within its gamut the enormous range between every art to please and death-dealing fury.

It is, with few exceptions, the law throughout nature that the male shall take the active part in courtship. It is not, therefore, to be inferred, as it often is, that the female does not take an equal share. To think this is no more rational than to suppose that the positive pole of a galvanic battery could, without association with the negative one, transmit an electric current. The simple truth is, as stated, that the male almost universally takes the active part in courtship. The reason of this may lie down deep in physiological differences between the sexes, leading the male to greater impulsiveness and the female to relative passivity. But we cannot reach the cause: the fact, however, is indisputable. This being settled, we find that fact to be a point of departure for the demonstration of the effects of sexual selection among some of the lower animals.

In the lower animal life we observe, of course, types which, from their slight development of intelligence, seem to show no individual preferences whatever: any male is a male, and any female a female, equally delectable. But when we rise in the scale among animals to higher grades of intelligence, we find manifestation of preference in many ways similar to that of

human beings. We find among birds, for instance, the most marked evidence of preference for certain individuals of the opposite sex. Pigeons afford an excellent opportunity for observation of this sentiment, for they are singularly faithful to their loves. Yet, faithful as they are in that respect, the existence of preference among them is at times additionally exhibited in the case of what is known among fanciers as a "coaxer," or "gay bird," a sort of rake of a pigeon, which is sometimes able to seduce another bird from its allegiance to its mate.

Birds in their wild state can be and are watched from places of concealment by naturalists, and their whole love-making can be and often is recorded. The commonest observation shows how productive courtship and rivalry are of music among songsters. It seems idle to argue that the birds must be pleased with song. If they were not, they would not sing. It seems self-evident, and observation confirms the view, that songsters must be pleased with song,—both singers and listeners. The singer, when caged and entirely by himself, often prolongs indefinitely what seems to human ears a joyous melody. Why, then, is it not certain that to his ears it must be a pleasure, and, if so, to one of the opposite sex that he may wish to mate? In the wilds he seems to sing not only to excel a rival, but to please his female choice. All three must be critical in musical performance, else there could be no rivalry through competition, and no love elicited through the most unwavering song. That the suitor and rival, or rivals, should make so much exertion as singing involves, without any object to be obtained, is incredible.

The meeting-places of birds are, naturally, as various as their habits. Among songsters, the grove is vocal with their melody, and they fly from spray to spray in delighted vagaries of wooing. Among certain birds of another kind, which may be generalized under the designation of game-birds, and which resort to the ground for locomotion more than to the air, many

species are notable for beautiful plumage and dangerous weapons. Now, it is to be remarked that, as, with rare exceptions, a bird, however game, is not called upon to use its weapons against other species, the swoop of a hawk or other enemy giving it the opportunity of using them only in the rare case where the attacker has become entangled with another quarry, it is evident that the purpose of the weapons of the male is for service against individuals of his own species, and, moreover, that these individuals are always males.

When, then, birds of these species gather together in the open spaces where they love to congregate for the holding of their love-feasts, and, by cries, struttings, and antics of all sorts, display themselves before the assembled females, "peacocking it," as the French could say by the word *pavoner*; when sanguinary combats, injury, and sometimes death ensue therefrom, it is not to be denied, when we find that it is only the females which can excite to such manifestations, that the females are, in their passive way, parties to and in equal degree responsible for the consequences. If the ordinary prize-fight were concerned, they would all be liable to arrest as aiders and abettors of the fight. The motives which prompt these contests are therefore just those which every human heart recognizes as perfectly comprehensible. They are fundamentally human as to inspiration, having the closest relation to conflicting choice and mating. The allurements are personal ornament and a sort of swashbuckler gallantry. That color is both liked and disliked by animals the simplest experiments prove. We have ourselves been unpleasantly near a bull's demonstration on a red flag, and we imagine that there are few who do not know that the ordinary frog seems to love a red rag as much as the bull seems to hate it.

Some of the lower animals, then, through displaying their charms to the best advantage, evidently compete with each other for the affection of individuals of their kind of the opposite sex.

This indicates, not only on the part of the males, but also on that of the females, the perception of relative desirability in individuals, both male and female. Relative admiration, of course, implies relative desirability. If there were no relative admiration there could be no relative desirability perceived, and then there would be no fighting. Not even birds fight for what they do not desire. And, throughout the scenes which have been described, perception of relative beauty, or, at least, belief in it, based on generally agreeable attributes, is the fundamental cause of the contention. If, then, beauty and gallant ways and knightly strength and skill are recognized by these animals, and recognized in the manner and with the immediate results described, that is only to say that they are proved to be rational (if our own human ways are rational) bases for choice and mating. Relative admiration, in all its phases, is clearly implied by action exactly like what should be comprehensible to higher beings possessing similar, if more exalted, sentiment. The personality of the suitor is presented, according to his knowledge, in the most favorable light for his acceptance, and that he is relatively acceptable upon the grounds upon which he counted on being pleasing is proved by the event. So, whether a bird sings, or does not sing, or is a thing of beauty and a fierce fighter, it is pleased in the same way, if not in the same degree or with the same nice discrimination, as human beings are with form, color, music, and gallantry in fight and wooing.

It is from this source that the effects of sexual selection flow. The action of certain birds in wooing was chosen as the best means of demonstrating that in nature gradual change must flow from it, because birds, of all the lower creatures, afford the greatest facilities for observation of sexual habit, are those which have consequently been the most closely observed, and at the same time are those which are the most highly gifted in the directions that render changes in them readily comprehensible.

But, wherever among animals individual preference is exercised in the relations of the sexes, similar consequences to those which we are now about to examine must ensue.

Birds are attracted not only by the beauty of color, but by the ruffling of feathers, strutting, dancing, and antics of the male, as any one can testify who has ever observed them in the state of nature. Remembering that among birds it is the female which, however much the male expresses preference, generally exercises final choice, guided by certain physical traits, such as swelling display of form and color, and by admiration of superiority in the moral traits of courage and prowess, that it is the female which makes final decision in favor of an individual male, it follows inevitably from the coincident fact that these males which are favored being those which are generally the most adorned and the best armed (else they could not be beyond others successful), must leave the greatest number of offspring of their sex as the best appointed descendants of the species. The general tendency, therefore, is for the males of certain species of birds to become more and more beautiful, and better and better armed, and so the weapons and the plumage of a species become indefinitely improved and beautified.

The gay colors and gallant ways of the barn-yard cock have attraction for the hen, as any one may observe if he will but look. Domestication does not cause either of them to lose the impulses derived from nature. In the barn-yard it is observable that the young cock comes sneaking around to gain possession, and sometimes does gain possession, of a hen, to be relinquished hastily with an affrighted squawk as the cock of the walk appears, and the other takes to flight. So also in the state of nature we may observe, among the gallinaceous fowls, the fierce old cocks battling in the arena for possession of a greater or lesser number of the attendant hens, while some young cocks, unable to try conclusions with the others, happen to please hens and elope in

a barn-yard, or indeed, human fashion, leaving the old fellows to fight it out for some of the prizes that have gone. This is one way in which the female exercises choice. In another she has Hobson's choice, none at all, and becomes the captive of the spear and bow of some supremely redoubtable master. In another, however, in a far greater degree than the first, she exercises choice among the victors. It is evident that choice she has, and choice she exercises; whereas, in the gallinaceous tribe, what the cock chiefly battles for is no choice at all, but the possession of as many hens as possible.

There are a few instances of the converse case, confirming the statement made as to the effect of the exercise of final choice. There are a few species of birds where the female, and not the male, is the active party to the courtship, and the effect just described is then reversed. It is then the female, and not the male, which is distinctively armed and adorned, and which does the fighting and directs the family. Whether or not this is a normal condition, resulting from the fact that the species is deficient in number of males, is not known. The fact, however, whatever the cause of it, serves equally well to illustrate the concomitant effect of a reversal of the ordinary course of nature, that is, the sex of the party to the nuptial contract, represented by the individual chosen for exceptional attributes, is that sex through which comes to the progeny of the same sex development of its characteristics. When the cock is the defender of the family he wears the weapons and the uniform of war. When the rôles are reversed it is the hen which wears the insignia of rank. The same thing is observable among the women who are called strong-minded.

It will at this point doubtless be inquired by some reader not conversant with the working of the laws of heredity, how it happens that to the progeny should not eventually be transmitted equally, as between the two sexes, the attributes which

are acquired through the maternal choice; why they should be confined only to the male sex? If the reader can ask such a question, perhaps he will answer, first, why it is only the male which originally possessed the attributes which are alleged to be susceptible, through sexual selection, of modification in the male sex. If the male be chosen for certain characteristics by the female, the characteristics for which he was chosen are necessarily male characteristics, and, therefore, are necessarily continued in the line of descent to the male progeny. But, to a certain degree, those attributes are transmitted to the female sex; not, however, as distinctively as to the male.

If certain physical attributes, such as weapons, are acquired in high degree by the male sex of a species of birds, they will be transmitted in some degree to the other sex, for the spur, for instance, regarded simply as such, is not confined to the male bird. Even the spur of the ordinary barn-yard hen is sometimes quite well developed. But it is only exceptionally as well developed in the hen as in the cock. The hen requires spurs for the defense of her young. The difference between the action of the two sexes is that the cock tends to use his spurs for aggression, but the hen hers for defense. When, however, as has been noted, certain structures which, as the general rule, especially characterize the male, are possessed by the female, corresponding physical and moral attributes are also possessed by her. Although, for the sake of brevity, the rare case of reversion of the ordinary rule as to the relations of the sexes has been noticed only as happening in the case of birds, yet there are known cases of reversion of a similar kind among some few other animals.

Nature ignores that which is useless to an animal in proportion as it comes to be more and more useless, and more and more augments that which is useful as it comes to be more and more useful. Structure can increase more or less in function. If structure is impaired, loss of function diminishes with it. If

function decreases, structure proportionally declines. Structure may suffer entire loss of function. Diminution of function may lead to atrophy of structure. Long cessation of function renders once active organs rudimentary. Renewal of old function, or creation of new, means growth of structure. Traits which are distinctively male and female continue to be maintained through differentiation chiefly within the lines recognized as respectively male and female. Nature having declared through her works that all development shall relate solely to the welfare of the individual, through the relation of structure to environment, and increasing, diminishing, or withdrawing structure as needs declare that it is more or less fitted for the conditions of life, sexual selection, potent as it is, is thereby still subject to the inclusive law of natural selection. That which is useful or useless, including the ornamental within sexual lines, finds no escape from the universal law that, under any and all conditions, only the fittest of everything for the benefit of the individual shall survive.

The geological record is confessedly imperfect. That is to say, that the archives of the past history of the earth, folded away amid the strata of by-gone geological periods, do not present such perfect sequence in the account of life as the theory of development would desire. How could it be otherwise? Some remains are too perishable to last long under the most favorable conditions; fire has carried on a work of destruction, and the upheaval and sinking of areas of continental size have been concerned in their manifold disappearance. The delving, too, of man is necessarily extremely limited in its efficiency; and so, while millions of records remain beyond his power to reach them, others, possible to reach, must forever elude knowledge of their existence. Whole groups of intermediate forms are lacking to series in the ordinary development of life, and other series seem to have arisen spontaneously and left through their remains

record of their existence in some places. Yet, when we come to consider all the destructive and concealing agencies concerned, migration accounting for the sudden appearance of a certain form, to the exclusion of one which might have been expected ; the presence in other places of a close sequence of allied forms ; the fact that, yearly, the differences between forms that were once thought to be wide asunder is bridged over by some new discovery ; the inevitable conclusions, for instance, from such a case as that of discovery of the progenitor of the horse, showing that that animal originally possessed toes ; we may truly say that the record, although imperfect, through being fragmentary, has left pages of such conclusiveness as to indicate the tenor of those which have been lost.

When, further, we come to the study of embryology, with the aid of the wonderfully perfected microscope of modern times, and find that the embryo is a brief abstract and chronicle in time of the history of the type of beings which it represents, indicating its development in accordance with suggestions otherwise derived, the conclusion as to these being the processes of nature becomes more and more confirmed. Doubtless there is a limit beyond which human investigation cannot proceed, even with the aid of the microscope ; the theoretical limit of the instrument is perfectly well known, and does not pretend to reach infinitude.

How much or how little the Creator may permit man to know, it is rash for man to decide. It is certainly permissible for him to know all that his faculties render him capable of understanding. To deny this proposition would involve the contention that man had been given understanding for less than its fullest use. The agnostic who speaks of God as the absolutely Unknowable is as arrogant as he who could think of Him as the absolutely Knowable. Incomprehensible God must needs be, else he were not the Creator ; but knowable He is, in a certain

degree, to every creature in whom He inspires the expanding moral sense, and who bows down before Him through his works, His creation by one supreme law, through whatever source mediately derived. True science sees in nature one continuous miracle. Unscience looks for interminable special miracles, as from the magician's wand. Knowing little of the general physical laws of nature, it is ever ready to believe in continuous special interpositions in their course, blind to the existence of the all-pervading, greater, central miracle of their self-contained perfect action.

CHAPTER IV.

MAN'S SPIRITUAL PLACE IN NATURE.

THE chief obstacle to universal belief in the capacity of all animate things to change, and in their tendency to perfection, lies in the fact that with many it violates a preconception of their special creation and of the origin of the soul. Nevertheless, truth is truth as to its essence, one truth differing from another solely in the difference by which one is relatively more important than another through its consequences. If God is all truth, then it should seem that what would be most agreeable to Him would be the acceptance by His creatures of whatever fragment of truth it had been given them to comprehend. If it can be reconciled with conscience to reject at pleasure anything whatsoever which is perceived as truth, because it is in apparent conflict with some other truth, or for any other cause, there is left no criterion for belief. At every step in daily life we recognize as true that which not only conflicts with another conception, but seems positively to contradict it. Yet we do not recoil from recognizing both as true, nor are ashamed to confess that our inability to reconcile the apparent contradiction lies in the weakness of our understanding. What we think is the truth to us. Soul and body may be in conflict,—they often are; but the conscience, the individual capacity for truthfulness is not, however lowly organized, of dual nature. When its decisions, as revealed by men's conduct, seem to conflict with one another, it is not conscience that has spoken, and contradicts itself, for it is the silent monitor, but fear or some other base motive which is warping, suppressing, or in some other way constraining tacit admission or utterance of conviction of the truth.

The question, however, arises whether there is any such

single alternative offered as that which the fears of many prompt them to think necessitated by acceptance of the law of development as true; whether acceptance of the law as true is incompatible with belief in revealed religion, and means acceptance of materialism. To him, doubtless, who believes that the Scriptures in their entirety, both Old and New Testaments, are directly inspired throughout, and therefore every jot and tittle therein is necessarily true, the discovery that any part could not be, is liable at any moment to shatter his faith to the foundation. Such a one, however firm he deems himself, stands on most uncertain ground. To one, however, who looks upon the Scriptures as the work of men who, although inspired by the truth, still necessarily uttered it with human limitations, through the vehicles which they had, the conceptions which they possessed, the language which they spoke, he perceives that it must bear with it the stamp of the imperfections of its intermediate source. One can readily conceive of men inspired to testify to such truth as was committed to them, communicating it to others with imperfections, and yet the essential truth remaining undisturbed. In fact, the very limitations under which such men would strive to tell the truth would in themselves make it comprehensible to mankind. Thus, and thus only, could the essential truth come within the sphere of general recognition. How otherwise can any truth be known unless it come within the lines and grasp of human thought? The only inspiration which could have been effective was that within human limitations, and these include in both teacher and taught the general and special knowledge possessed, and vary with every individual, nation, and race, and through every age and clime.

To one, therefore, who, instead of believing that God created man and all things by His omnipotent fiat, believes that he made the earth in six days, and rested on the seventh, and specially created Adam of the dust of the earth, and then, casting a deep

sleep upon him, fashioned the first woman, Eve, from one of his ribs; who believes that He ever caused the sun and moon to stand still; who believes these and other similar things, believes in the Bible in a sense which, if others were converted to it, would sweep away forever from their vision the semblance of an all-wise Creator. It is the infatuation which holds on with tenacity to every useless, crumbling scrap of cement that entered into the magnificent edifice and citadel of Christianity, that enables its enemies to go on relentlessly sapping at its foundations. Shall it be said, if one doubt anything here, upon however apparently good grounds, that it were safer to believe, for the ways of God are past finding out? Of a surety they are, and such an account of them would seem to make them of all ways the most easy of discovery. Can any one believe of Him who created light that He would resort for any cause to a mandate that the sun stand still? Is the standing still of the sun to be literally understood? The sun, sweeping onward with the whole solar system toward the bright star Vega, near the Milky Way, has that proper motion and another, rotation on his axis. Standing still as to either motion would not affect diurnal duration of light upon the earth; therefore a mandate to the sun to stand still cannot be taken literally. Shall it be taken as inclusive of allowance for the astronomical ignorance of the times permitting men to believe that the sun revolved around the earth, and suppose that, correctly interpreted, the mandate meant that the earth should stand still? The earth's standing still would mean arrest of both orbital and axial motions. The catastrophe that would have ensued to the armies both of Joshua and the Amorites would have been appalling, in the indiscriminate ruin that would have absorbed all question of victory or defeat. The solid rock of the earth would have crumbled to its base, and mountains toppling to their fall would have rushed wildly as meteors into space; the moon, supposed to have stayed to lend

her light for victory, would have swept onward beyond her orbit. If the Creator had for a transient purpose been willing to interfere with His general laws, how impossible it is coincidentally for Him to have so interfered as to defeat his purpose by wrecking a world, from which, still enduring, we worship Him dwelling behind those general laws in majesty and power. The ways of God are past finding out. Aye, else He were not God. But, we can be very sure they are not such as these, but, like those which we see working all around us, of most magnificent simplicity, law within law stretching backward to the supreme law of all, to the Law-giver.

Can any one deliberately say that God created the earth in six days, and rested on the seventh? Regarding the Biblical account of the creation as an epithalamium, or song of praise and thanksgiving for all the wondrous works of nature, it is a most beautiful effusion, not exceeded by any thought that has entered into the mind of man. The days, as representing periods of growth; the resting at the end of the sixth period, as representing simply the cessation of the processes by which the earth came to be fitted for a world; the creation of man as representing the advent of the most highly organized being, who was to be the ruler on earth; all these, as generalized in the account, are of a truth represented by surpassing beauty of expression. Taken literally, they sink the account of the creation to depths from which all truth and beauty disappear. Nor is it simple truth and beauty which thus disappear with the literalness of such rendering. The truth is of that holiness which pervades the mind with a sense of the infinite. It dwindles away with the letter to insignificance. It is that sense of holiness which pervades all the Scriptures, amidst associated imperfections whose very presence brings conviction otherwise unattainable. We insensibly make allowance for the imperfection of the medium through which inspiration came, and all impression of ulterior

design among the authors of the writings disappears in perception of their steadfast thought and movement toward belief and action working for righteousness.

There is nothing incompatible, in what has been said, with the interpretation of the Scriptures by Him who, knowing the law so well that when, in the Temple, He sat as a mere boy amidst the assembled doctors, answering and asking questions, later said, when He had proclaimed His mission on earth, "Think not that I am come to destroy the law, or the prophets: I am not come to destroy, but to fulfill." Is there any evidence therefrom that He, accepted by His disciples as the highest interpreter of the law, regarded every word of the Old Scriptures as directly inspired of God? On the contrary, we find Him, while affirming certain things in them as true, putting aside others in a form of speech which is far, indeed, from affirmation of their universal, literal truth, impressing the mind with quite the opposite intention. For, said He not, to a concourse of Jews, "And they [the Scriptures] are they which testify of Me," but, in the same breath, "for in them ye think ye have eternal life." The law which Christ thereby affirmed was the law of the Old Testament; but in those writings there is much else besides the law. There is nothing going to show that Christ affirmed among them more than the truth of the law and the prophecies of His coming. Much of the rest, confirmed in the most wonderful way in the discoveries of modern times, amid the ruins of Assyria, Babylonia, and Egypt, relates to historical events seen through the minds of primitive men, and bears the stamp of aboriginal limitations.

Nor does this aspect of the Scriptures, although in far less degree, cease to impress the mind, even in the new Scriptures, there being no guarantee from Christ himself that the teachings of the best human instruments which He could choose from among men for His purpose would prove infallible. He himself

said, as summing up the misconceptions of the world as to His mission, "I came not to send peace, but a sword," and throughout we see, as communicated through the medium of many minds, that His spiritual meanings were constantly misconceived. He says, it is true, that after His departure "the Comforter, the Holy Ghost, whom the Father will send in my name, He shall teach you all things, and bring all things to your remembrance, whatsoever I have said unto you." So, at this late moment, just before the sacrifice of the cross, even those nearest to Him, His chosen disciples, did not fully understand Him. He had previously said, "And I will pray the Father, and He shall give you another Comforter, that He may abide with you forever, the Spirit of Truth whom the world cannot receive, because it seeth Him not, neither knows of Him; but ye know Him, for He dwelleth with you, and shall be in you." So that it was intimated to the disciples themselves that they were not, until after the sacrifice, equal to the truth, and that the world generally was incapable of seeing it.

But what is the truth which is referred to throughout by Christ, from the time of His reference to the Scriptures as predicting the coming of the Messiah, down to the period when, just before His death, He speaks in the most tender manner to the specially loved ones from whom He is about to depart? It was religious truth, the added fact to the prophecy, that God had sent the prophesied Messiah to redeem the world by a higher law and final sacrifice.

He had proved His mission by speaking as man had never spoken, and by acting as never man had acted. It was this central truth, with all its consequences, with which the Holy Ghost was to imbue the disciples, from whom it was to radiate in holy effluence upon mankind. Christ affirmed no other than religious truth, the truth as to the living God, His own mission as the Saviour of mankind, and the divine influence which thence-

forth should illumine the minds of men. The world had to wait for centuries before the true cosmogony was known. The science of biology is of most recent growth, and that of geology scarcely dates back to the beginning of the century.

If men look to the continued beneficent spread of the Christian religion, it would be well for them to cast behind them all extraneous matter relating to truths that are independent of each other, occupying entirely different spheres of thought. It is the spirit in religious things which quickeneth: the flesh profiteth nothing. Cling to the idea that belief in Christianity is conditioned on belief in the literal meaning of every sentence and word of the Scriptures, and at any moment faith in them may be shattered. Believe that men cannot see beyond their discernment, cannot correctly interpret and communicate what they do not fully comprehend, but, notwithstanding, may be possessed of some great essential truth, and then the Christian religion is reconciled with every discovery of science,—not, as upheld by many of its defenders, weakly shifting from one to another untenable position. From this point of view the promised enlightenment from the Spirit of God, which was to comfort men, includes within it all that science may know and discover, for science is but one path of reverential approach to God.

Christianity, divested of the inevitable imperfection of the medium through which, through a long period, it gradually approached and finally reached mankind, rests within its own sphere upon as irrefragable evidence as any which can bring conviction to the mind. What if there are savage tribes which do not know of God? Is there not reason to believe that once such was the condition of man over all the earth? Is not the prospect most hopeful now, when we regard the enormous mental range between the extremes of men as represented by the savage and the civilized? What if the agnostic can speak of God as the Unknow-

able? Does he not thereby grant the existence of God? Granted the existence of God, thereby is conceded His existence as the Creator. If He is the Creator, then He cannot be indifferent to the highest of His creatures on earth,—the crown and summit there of his creative will, distinguished above all else by the development of mind. If we are to regard mind as no more than evolution of matter to high percipient consciousness, reacting upon the individual body, and, through utilitarian experience rising to conscience, then “we are,” as Saint Paul says, “of all men most miserable.” But if, on the contrary, we are to regard mind as the afflatus of the Divine Spirit, which, by gradual evolution, associated with corporal agencies fitted for the conditions of earthly life, eventually places man in the position of a being responsible through conscience to the Creator, we must deem it the sanest conclusion of the most mature thought.

The heathen and the worshiper of the one God alike yearned for a token of divine superintendence, prompted by the instinct and reason which, at a certain stage of mental development, looked beyond the earth for a token of an even grander revelation of the significance of creation. As, among monotheists, man was believed to have been created in the mental likeness of God, and to hold those relations with God which the maturing conscience leads him to conclude exist, it was naturally credited by millions of beings who dwelt on earth that, in due time, He would indicate His presence and His will. Men’s belief that one might be so commissioned of God is, of course, no evidence that there would be such an advent. It affords merely presumption as to the probability that a sentiment so almost universally experienced at a certain stage of mental development represents an unrevealed truth.

Here, men, at a certain period of the history of the world, entered upon another and entirely different phase of evidence, the strength of which must be judged like that of any other

human evidence, for the appeal is on no other ground than to human reason, through evidence from human sources.

As has already been intimated, men being human, it could fully reach their understandings in no other way. The fact that the evidence is human upon which we are to believe or disbelieve in the commission of Christ as divine, is therefore no disparagement to its weight. Christ himself appealed to it as that which proved its divinity. All that we know and can possibly learn as to the earthly or divine must rest upon what can reach us through the avenues to the human intellect. The conceptions which at any time exist in the mind upon which perception can be based, are all that we possess by which to judge of and to accept or reject any new proposition. It is therefore only by this means of reaching the sort of conviction which we denominate truth, that our conclusions as to the divinity of Christ's mission must be reached.

That He lived and taught we must know, for, aside from the narrative of His followers, both those indifferent and those inimical to Him have recorded His existence and teachings. Josephus mentions Him, and Publius Lentulus, a Roman centurion, who happened to be stationed in Jerusalem, wrote to Rome a description of His ways, and even of His personal appearance. The fact of His existence, therefore, and of His teaching, and of the character of His teaching, cannot be denied. He indisputably lived, and, according to testimony of the most diverse kind, He died upon the cross, reviled by His persecutors, and sorrowed over by His friends, as no man before or since. He had lived and taught for years the way of life, which we now find embodied in what is called the gospel. He lived in the broad light of day as men have rarely lived. And in this time no flaw or stain was to be found from the beginning to the end. The evidence of this is more complete than that which any single man can acquire from personal observation of any event. Christ

is seen through the collective testimony of men of the most diverse minds and leanings, throughout His whole career, some of whom wrote of Him after His departure with such diversity, that the aggregate of testimony brings greater conviction than otherwise, because, while differing as to particulars, it never conflicts in essentials, or deviates from presenting the same perfectly majestic presence.

Fanaticism has had no such knowledge, nor ever such life and action. The ancients who had risen above the stature of their compatriots had taught a morality of the reason, but here was one who addressed men, compounded as they are of reason and sentiment, and who taught them that the highest reason in religion leads to the highest law of love. Christ spoke as one having authority to speak, and so conclusively to those who were not looking for an earthly king, that with a revelation of goodness which the world had never seen He carried all before Him in the triumphal advance which ended with His injunction to His disciples to go and teach all nations. None the less, because His example and teachings have been obscured by ceremonial and strife, have they continued to advance and conquer and rule the world to seeming perpetuity. Where would the world morally be now, if at the period of Christ's coming it had not been saved by His message from the condition into which it was plunged? Whence, therefore, one may well ask, could such a change as has overtaken it have come, except from God? Although the world was then, as the event proved, far enough advanced to be receptive of the highest moral law, it would still have gone on regardless of it if Christ had not appeared and shed upon it His enlightenment. That one lowly born and bred and educated should appear and prove himself the master and king of men, swaying a world centuries after His death, is not to be ascribed to any but divine commission.

The existence of God should be manifest through creation.

It should again be manifest through the coming of Christ. Only to him who denies the existence of God, should the mission of Christ be doubtful. If it seem doubtful, then is evidence, which in its cumulative force is equal to that on any other subject, rejected. Assuming the existence of God, and the implied watchfulness over a creation which He has seen fit to make, in no other manner so effectually could a way of life have been shown to men as by the precept and example of one of whom could be said, *Ecce Homo*. Not less comprehensible is it that the coming of Christ should have been for the salvation of a fragment of the universe, when we reflect that, if it had been within the purpose of the Omnipotent, a Saviour might have lived and died at the same or another time in worlds innumerable, or that the purposes of the Omnipotent, being necessarily as infinite as the universe, of which we see but a part, we, of proved incapacity to understand fully what touches us most nearly, need not explore beyond into the depths of the unfathomable. If it be asked by the materialist, if a divinely authorized earthly dispensation would not, from what has been said, be as much an interference with natural laws as any that can be conceived, the answer is that it has not been here implied that God would never interfere with physical laws, but merely that He would not interfere with them except for good cause. When we see around us a moral world as well as a physical world, we need for comprehension of its existence, as much as for comprehension of the existence of the physical world, to infer the will of the Creator.

At a certain stage of mental development, the depth of whose degradation may be estimated by observation of some still-existing tribes, man was undoubtedly too low in the scale of being to develop the idea of a Maker and Ruler of the Universe. But, with the development of the organ of thought, the brain, came, among other attributes, the birth and growth of

conscience. The first faint glimmerings of the religious sense may have been produced, as Darwin, Spencer, and other writers think, by fear of ghosts, of shadows, and of all the mysteries that haunt the path of the untutored savage, leading to propitiatory sacrifices and rites of all sorts; and the pressure of rude wants may have led to awakening of some perception of mutual dependence, but not, as these authors think, to some experience of sympathy, and thus to the first germs of conscience. These, assuredly, were only adventitious aids to the development of conscience from the first beginnings. Sympathy, with utilitarian basis, might have seemingly gone on forever without producing conscience. In fact, to think of such action, as mutual exchange of offices from necessity, as awakening sympathy, when both motive and action represent barter, is to form a false conception, for if conscience be anything definite it is, at its lowest conceivable point, the reverse of utilitarian.

That Darwin was liable egregiously to err in discussing these questions, which are so foreign to the domain in which he supremely reigned, is proved conclusively by his remark in "The Descent of Man," where he says, "My critics do not define what they mean by remorse, and I can find no definition implying more than an overwhelming sense of repentance."

Yet, even in the ordinary acceptation, these two affections of the mind are regarded as essentially different. Both repentance and remorse, it is true, are fundamentally based upon grief, but whereas the grief of repentance represents to the mind of the sufferer grief capable of being assuaged, because the cause of it is capable of redress, or of expiation by suffering, or both, the grief of remorse offers no such flattering prospect to the mind, for in it the grief is conditioned upon belief in its being beyond the bounds of possible redress or expiation by repentance. Can there be any two affections of the mind more diverse than these, into one of which hope enters,

and in the other of which the grief is so excessive as to be centred less in the idea of the wrong done, than in that of self-condemnation? That remorse may engulf even grief for wrong-doing is proved by the fact that to fiends is imputed in their despair the desire for the perpetration of further evil. What is imputed to these is what the collective soul of mankind is conscious of as representing the final outcome of hopeless repentance. This is what distinguishes remorse from repentance, and makes of it another sentiment and law of conduct. It is the difference in thought and action as inspired by hope, as contrasted with thought and action as inspired by despair.

Dickens evidently had no doubt of the difference between the two passions, for we find him writing, with the instinct of the born psychologist, in the description of the elder Weller's last interview with the Rev. Stiggins:—

Mr. Stiggins, encouraged by this sound, which he understood to betoken remorse or repentance, looked about him, rubbed his hands, wept, smiled, wept again, and then, walking softly across the room to a well-remembered shelf in one corner, took down a tumbler, and with great deliberation put four lumps of sugar in it.

Observe that the sound uttered by the elder Weller struck the Rev. Stiggins as indicative of remorse *or* repentance.

Conscience, even in its lowest estate, is to be regarded as a creation appearing at a certain epoch of man's existence, subject to growth and aberration while constrained along the lines of evolution. To him, therefore, who regards mankind as compounded of moral, intellectual, and physical elements of being, each equally the endowment of the Creator through supreme law, each developing side by side, each ascending from inferior to superior type, it is not incomprehensible that growing religious perception should have instituted false religions, or that a divinely-appointed exemplar should at last have placed the seal upon a world fitted to profit through ages by the presentment of an unattainable ideal of human excellence.

CHAPTER V.

MAN'S PHYSICAL PLACE IN NATURE.

WE have now reached a point where matter extraneous to the subject, constantly obstructing its fair discussion, having been put aside, we can dispassionately examine the question involved. The only remaining difficulty to be encountered in discussing it is one which, owing to the constitution of the mind, is unavoidable in the examination of any new proposition. The mind, while searching for truth, and eagerly imbibing it (desire to know the truth being, as John Stuart Mill thought, the dominant characteristic of mankind), is nevertheless strongly conservative in its tendencies. For proof, one has but to look around to see how at the mercy of circumstances most conviction is. The savage implicitly takes upon credit what he inherits in belief from his progenitors. So he goes on, generation after generation, making no advance. The civilized man, too, but with a difference to be presently noted, believes what is transmitted to him, because he, equally with the savage, must accept the main stock of beliefs presented to him, for it would be as irrational in his case as in that of the savage for him to reject that which there is nothing to replace, and for each individual thus to begin the world afresh, and because, from the beginning to the end of life, as no one can learn everything for himself, he is perforce obliged mainly to accept as true that which he finds at hand.

Thus we see among men manners which they inherit, religion which they inherit, and knowledge of nature which they inherit. But there is this important difference between the civilized and the savage man, that the mind of the former has become more plastic than that of the other. He is open to conviction on subjects in which his senses belie the facts. He knows that the

senses alone are most fallible in their conclusions. He uses them only as avenues by which impressions reach him, and he summons them as witnesses to testify before his intellect, to contradict or confirm each other, and thereby make manifest the truth. On the contrary, the crucial test of the savage is a single one,—the visual test. With him seeing is believing. He is unequal to the conception that seeing may be illusory. So also, and for the same reason, it is to be observed in the uneducated, among civilized beings, that seeing is the final test of right to believe.

The educated, although they do, as admitted, possess a stock of inherited beliefs, differ in sum from the savage and the uneducated among the civilized in the important points, that they are perfectly aware that a portion of their stock of beliefs must, from the nature of things, be erroneous, that they are distrustful of their powers of reaching truth, and that they are consequently careful in arriving at conviction. This attitude of mind is the only sure foundation for advance. The world can advance on no other terms. The modern investigation into the nature which we see all around us is, as was the ancient, with most imperfect means, prompted by an inherent desire to know and to abide by the truth. The prompting has been called scientific wonder, which term truly designates the feeling with which men approach the mysteries of nature. To suppose that it is not associated in the majority of the ablest minds with a reverential attitude is to be ignorant of the glories that are unfolded, and of the effect of their contemplation.

Love of the truth, from the lowest savage, from the virago of civilization who, standing with arms akimbo, listens to gossip about her neighbors, to the one who lives in the world of microscopic beings as well as in his own, or the one who sits observant of the marshalling of the stars, is a distinctively human attribute, capable, as these extremes show, of infinite development for

good. It is developed love of truth which is leading the present great advance of civilization in science, literature, and the arts. It is this prompting which has led to investigation of the genealogy of man, the sources of his earthly being.

When we survey the whole animal world a most remarkable series of facts present themselves. We find individual life bound up in a single cell, in colonies of cells, in animals composed of a few cells, and in those composed of multitudinous cells. We find cells in the same animal producing tissue, and, while so producing, changing their forms to suit special purposes. We find in the human organism, for instance, excluding the primary, and from the first, somewhat differentiated cell called the ovum, or egg, cells which seem capable of infinite differentiation, to form bone, marrow, skin, and all other parts of the body.

Passing beyond these phenomena, we find in all the animal kingdoms strange similarities, masked by dissimilarities, of structure as representing function. We find, referring now only to the vertebrates, that even skull and brain seem to be graduated from vertebræ, one of the lowest, if not the very lowest of the vertebrates, the lancelet (*amphioxus*), which was classed by Cuvier as a worm, being without a head.

But now, confining ourselves strictly to the vertebrate sub-kingdom, lest we become involved in considerations too extended for our purpose, it is to be remarked that we find among them a distinct graduation among organs. Just as before we saw that, comparing living with extinct forms, there is reason to believe that among animals there has been a continuous related translation of one form into another, these branching off at times from some common progenitors into separate lines of descent; so, also, we find, among vertebrates, external and internal differences of structure relating to function, which seem to graduate into each other. More than that, when we come to examine at different periods of its development the embryo of the same

animal, we find singular attributes to be possessed by it apparently unnecessary to its present or prospective existence.

That all things which are known to us should present in every respect conditions the object of which is manifest, is an untenable proposition. But that all things which are known to us should not present contradictions between the main conditions observed and the main purposes of life to be subserved, is a perfectly tenable proposition, for, when there is a contradiction between those main conditions and the main purposes of the individual life, we reject those things which are in opposition to the main purposes of life, as having no relation to it. The dew-claw of the dog is not only not of service to the animal, but is of positive disservice to him, being frequently injured and causing him uneasiness. We therefore reject it as having any adapted relation to his present life, and recognize it as a rudiment of what was originally useful.

Now, the human embryo, the fœtus, does not respire through the lungs. It could not breathe through its lungs, because it is submerged in a fluid called the liquor amnii until, the period of gestation being past, birth begins. The first respiration which the newborn child makes is accompanied by a sneeze or a cry, showing the unwonted impact of air upon the lungs. It respire, as do all placental mammals, or those animals which have a placenta and suckle their young. The placenta, a vascular, temporary organ (the after-birth), conveys to the fœtus, through the umbilical cord, circulation derived from the mother, involving the oxygenation of its blood and the removal from it of effete matters. The umbilical cord, containing the proper arteries and veins, which cord directly connects the unborn child with the placenta, is the only means by which circulation, respiration, and nutrition are effected in the unborn child by the circulation of the mother.

Beginning with the mother herself, we see, through embry-

onic development, that the whole vagina and neighboring parts are graduated from, and still rudimentarily contain, a lower form of structure for the function of gestation and parturition. The embryo shows at every stage remarkable progression from lower forms of life, among the rest what are regarded as rudimentary branchiæ, or gills. All these, however, have, by the period of birth, become completely aborted and transformed into what we know as appropriate to man. The very same parts serve for either male or female, depending upon what course they take at a certain stage of development. What right have we, therefore, if the same parts can develop into either male or female organs, to say that other parts, having nothing to do with difference of sex, do not, when aborted in certain directions, and taking definite lines of development in other directions, indicate structure which was pre-existent in the adult being, and which must, therefore, although long discontinued, represent some of the previous history of the organism?

The majority of scientific men accept the conclusion indicated. It is believed, and with reason, as was remarked in one of the preceding chapters, that the embryo contains within itself, at different stages of its development until birth, a brief abstract and chronicle in time of the being concerned, an epitome, as it were, of its previous existence. Like all epitomes, however, this must necessarily contain a record, correct as far as it goes, but lacking fullness. It cannot be supposed that the embryo itself has not lost some of its original characteristics. What has been said elsewhere would conflict with the view that it has not undergone any change. But the history of an animal should be preserved for a far longer period, through the characteristics of embryonic life, than through those after birth. For, whereas, whatever in life after birth is not conducive to its well-being in the struggle of existence, tends to be eliminated; that which does not so especially concern life after birth would tend

to remain unchanged and recorded in the embryo. When we consider how enduring are certain post-natal useless characteristics, when they are of no great disservice, as in the case of the vermiform appendix in the human bowels, a small *cul-de-sac*, we may well understand how, in an embryonic feature, nature might permit the record in the embryo to remain indefinitely. It stands to reason, as was indicated, that the embryo should retain certain characteristics of an original condition indefinitely longer than the animal does after birth. But, besides, the development of the embryo proves that it has retained volumes of life-history of which the animal, just before birth and ever afterward, scarcely shows a trace. We have, therefore, in favor of this view, a probability, in this aspect of the case, amounting to a certainty.

The general anatomical correspondence between man and the highest of the anthropoid apes are such as to render conception of the graduation of man into his present form, through some similar organism, not so improbable as might at the first glance appear. But anatomy and physiology do not glance at the nature of things. They probe to the inmost recesses which they can reach in physical life, and accept only those conclusions which seem forced upon them by rigid reasoning. If we are justified in reaching any impressions from superficial examination, it is undeniable that conclusions which do not rely merely upon first impressions, but which are the fruit of long and patient study, are entitled to consideration.

Titles of all sorts have been devised by which man can be distinctly designated as entirely different from the lower animals, such as the tool-making and tool-using animal, all relating to perception of his vastly superior relative intelligence through brain, and mechanical ability through the possession of a well-organized thumb. When, however, we come to examination of his physical characteristics, as compared with those of the

highest of the anthropoid apes, we find that the difference between them and man shades away by degrees. Man walks erect, They can walk semi-erect. They are hairy. So is the unborn child. Adult man is in a certain sense hairless. But there are among mankind very hairy races, and even among the highly civilized of mankind there are hairy individuals. Moreover, where hair is least conspicuous on the person it still exists in what is called the lanugo form all over the body, except on the palms of the hands, the soles of the feet, and the mucous membrane openings to the interior of the body, such as the lips. And to this fact may be added that the lanugo hair on the human body lies as to direction on the different parts just as it does on the anthropoid apes.

The anthropoid apes, equally with man, are tailless, but, in being tailless, both evidence, in the os coccygis, the lowest of the vertebræ, what seem to be aborted spinal processes representing another original constitution of the part. The internal organs are sensibly alike, with only those variations which are found among individual men. The brains are so similar as to make the comparison between them not so much one of degree as of kind.

Brain, being the organ of the mind, especially invites comparison between it, as it appears in man and as it appears in the lower animals, because it is through brain-power chiefly that man's pre-eminence in nature asserts itself. It is well, therefore, to observe first what physically renders brain most efficient as an organ; and, lastly, what are the chief differences as demonstrated between man and the anthropoid apes. Bear in mind, however, that man is not supposed to be descended from any one of them, but from a common progenitor, and therefore to have inherited through his descent certain traits by which he is allied to individuals in collateral lines of descent.

Full description of the brain is to be found only in works

on anatomy, and would find no appropriate place here. Fortunately, however, the brain possesses certain large characteristic features which are obviously related to greater or less excellence in its constitution. The great mass of the brain, the cerebrum, consists of what are called the cerebral hemispheres, which physically represent the highest type of the brain-power of the individual. The cerebrum, cerebellum, pons, and medulla oblongata, continuous organs, represent, in sum, the nervous system relating to the special senses and the movements of the body.

Low types of the cerebrum are characterized by great symmetry as to general and special conformation. The smallness of the cerebellum, or more particularly the greater or less degree by which it is overlapped by the cerebrum, is also another characteristic of low type of brain. In man, the higher the intelligence of the race or the individual, the less is the brain symmetrical, and the more does it lie in folds, or what are called convolutions. The brain of the microcephalous idiot evidences by its general symmetry and absence of highly convoluted form its great inferiority. In the lower types of the lower animals the cerebrum is distinctively smooth and symmetrical, while, reaching man, it is not only highly variable in size and symmetry, but is variously convoluted in the individual. The development in the human embryo presents the same general sequences, and through its testimony offers the same suggestions to the mind.

Other things being equal, size of brain is indicative of intellect, but other things are very rarely equal, and hence the very highest types of brain, those in which the greatest size and the most highly convoluted character are combined, are very rare. When such occur the person possessing them becomes, with opportunity, great among his fellows. According to Dr. Maudsley, one of the highest authorities on these subjects, quoting from a paper by Dr. Thurnam, the average brain-weight of ordinary European men is 49 ounces ; of congenital idiots, 42 ounces ;

and of microcephalous idiots, $37\frac{1}{2}$ ounces; whereas the brain-weight of 10 distinguished men named, among them Daniel Webster, was $54\frac{7}{8}$ ounces.

As far back as 1863, Huxley, one of the greatest of anatomists and biologists of any age, published a small work entitled "Evidence as to Man's Place in Nature," part of which was effectively a *résumé* of six lectures which he had delivered in 1860 to workingmen, and of two, delivered in 1862, before the Philosophical Institution of Edinburgh. In that work, while incidentally and provisionally accepting the Darwinian theory, he, confining himself to his own special branch of science, gave, after an ample discussion of the subject of man's derivation, his conclusion that, while man differs enormously from the chimpanzee and the gorilla, yet the points of resemblance are so numerous as to warrant us in believing that they are all derived from the same primitive stock. He said:—

But, in enunciating this important truth, I must guard myself against a form of misunderstanding which is very prevalent. I find, in fact, that those who endeavor to teach what nature so clearly shows us in this matter are liable to have their opinions misrepresented and their phraseology garbled until they seem to say that the structural differences between man and even the highest apes are small and insignificant. Let me take this opportunity, then, of distinctly asserting, on the contrary, that they are great and significant; that every bone of a gorilla bears marks by which it might be distinguished from the corresponding bone of a man; and that, in the present creation, at any rate, no intermediate link bridges over the gap between *Homo* and *Troglodytes*.

It would be no less wrong than absurd to deny the existence of this chasm; but it is at least equally wrong and absurd to exaggerate its magnitude, and, resting on the admitted fact of its existence, to refuse to inquire whether it is wide or narrow. Remember, if you will, that there is no existing link between man and the gorilla, but do not forget that there is a no less sharp line of demarcation, a no less complete absence of any transitional form between the gorilla and the orang, or the orang and the gibbon. I say not less sharp, though it is somewhat narrower. The structural differences between man and the man-like apes certainly justify our regarding him as constituting a family apart from them; though, inasmuch as he differs less from them than they do from other families of the same order, there can be no justification for placing him in a distinct order.

This Huxley said, despite the fact that the brain of the gorilla is only about half the size of the human brain. He

shows that the difference in volume of the cranial cavity in different races of mankind is greater absolutely than that between the lowest man and the highest ape, while relatively about the same. The largest human skull, he says, measured by Dr. Morton, of Philadelphia, the craniologist, had very nearly double the capacity of the smallest healthy human skull,—a far greater difference than that between the smallest healthy human skull and the skull of the largest gorilla. And he had found, in addition to this, that, in the fact of the anthropoid apes possessing true although imperfect feet, opposable thumbs, similar dentition, and similar internal organs to those of man, the belief is warranted that they belong to the same order with him.

So convinced did Huxley remain of the justness of his conclusions that, in 1874, he repeated them in these words:—

In view of these facts, I do not hesitate, in this year 1874, to repeat and insist upon the proposition which I enunciated in 1863. So far as cerebral structure goes, therefore, it is clear that man differs less from the chimpanzee or the orang than these do even from the monkeys, and that the difference between the brain of a chimpanzee and of man is almost insignificant when compared with that between the chimpanzee brain and that of a lemur.

Dr. Maudsley remarks, in his work on "Body and Mind," speaking of the action of an idiotic woman:—

Was it really the re-appearance of a primitive instinct of animal nature,—a faint echo from a far-distant past, testifying to a kinship which man has almost outgrown or has grown too proud to acknowledge? No doubt such animal traits are marks of extreme human degeneracy, but it is no explanation to call them so; degenerations come by law, and are as natural as natural law can make them. . . . Summing up, as it were, in itself the leading forms of the vertebrate type, there is truly a brute brain within the man's; and when the latter stops short of its characteristic development as *human*,—when it remains arrested at or below the level of an orang's brain,—it may be presumed that it will manifest its most primitive functions, and no higher functions. . . . We need not, however, confine our attention to idiots only. Whence come the savage snarl, the destructive disposition, the obscene language, the wild howl, the offensive habits, displayed by some of the insane? Why should a human being, deprived of his reason, ever become so brutal in character as some do unless he has the brute nature within him?

In Darwin's work, on the "Expression of the Emotions," he shows that the mute expressions of man and of some of

the lower animals throughout all the world are fundamentally the same. No matter how different the races or subspecies of man, they all express emotion in the same manner. And from this fact, taken in connection with another fact (of the enormous divergence of those races in every particular, —mental, moral, and physical), he justly deduces the conclusion that they must all be derived from some single stock, which must have been almost human in structure, and largely so in mind, before the races diverged from each other. That this wondrous conformity among races so dissimilar could have been acquired through independent lines of descent seemed to him incredible. Yet, as he justly says, that very incredible thing must have happened if the different races of men have descended from several originally distinct species.

That man is not supposed by any naturalist to belong to the same species as does the chimpanzee or the gorilla must be evident to everybody. Where does he belong in the animal kingdom? No one can deny that he belongs to the kingdom of animals, to the sub-kingdom of vertebrates, and to the class of mammals. Why should he then object to go into the next division,—the order of primates,—with the anthropoid apes and other forms, and demand, as a solitary genus, an order all to himself for his representation in nature?

His preference is simply a matter of prejudice derived from education, which will be entirely removed before many years elapse. Man has so looked upon and worshipped himself as a demigod, in his be-crowned, be-gartered, and otherwise decorated conditions, down to the very people, which regards its voice as the will of God, that he finds it hard to descend from his throne. Yet reason, the highest throne which he can ever occupy, should tell him that whence he came is of little moment compared with what he is, whither he tends, and what is to be his destiny. What difference, except for the better, does it make to him if he

believes that he is derived not from dust, but from some low form of life? Dust forms no term of comparison between a pristine and a present state of existence. All things being possible with God, man could as well have been created out of nothing as out of dust, and might have been created thus, such as gradual development might otherwise have formed him. If, however, he did but know that what most comports with his dignity is recognition of the truth, and if it be given him to perceive in at least one point the grade from which he has risen, he possesses a term of comparison which may well entitle him to look forward to the future of the race as of relative splendor almost inconceivable.

CHAPTER VI.

PHENOMENA OF EVOLUTION IN THE PRESENT ERA.

MAN has long been known as an anthropomorphic being, one who has fashioned God after his own mental and moral attributes, who, according to a doctrine which may now be considered beyond resurrection, doubtless growing out of literal construction of words in Genesis, once even went the length of believing that God is of human form. Yet it ought to be evident that man can be in only a very different and in an infinitely remote sense made after God's image and likeness.

The degree to which man has shown his anthropomorphism has never been partially realized until the present century, when science for the first time showed that even the limited part of creation around him on earth was not made exclusively for his delectation, but that the lowliest animals are organized, not as ministers to his needs and pleasures, but with reference to their own well-being. Even the insects, the aphides, which seem to be the veriest slaves to their ant-masters, who milk them of their nutritive juices, are really so organized that it is as agreeable to them to be milked as to their masters to milk them.

The theory, accepted for ages, that all things on earth had been made for the behoof of man, would have received a rude shock if it had been pushed to its logical conclusion. Wild animals drew for a long period quite a large amount of sustenance from his capture. Within easy recollection the tiger in India, and the lion in North Africa, have depopulated whole districts, while the death-rate in India from poisonous snakes reached, in 1877, the frightful number of 16,777 persons. The familiarity of insects, too, with the delicate cuticle of man was

not conducive to his claim to being sole lord of creation, seeing that the insignificant creatures drive him out of some parts of the world, and that his precautions must be ceaseless to keep them even out of his bed. Unavailing, however, was all this, as patent as it is now, until science proved conclusively that every creature had been created solely for its own good. Now, despite the fact that some books on natural history for the young still maintain the old point of view, as that the bee, for instance, was made to place in hives along hedge-rows, as the producer of food for man, the fountain-heads of knowledge flow in other directions, and will soon leave dry these stagnant pools of information.

Man stood at one time, in his own estimation, in the centre of all things. Not only did the sun and moon, according to his way of thinking, roll around him, to give him light by day and night, but the whole starry firmament, containing suns which dwarf our central luminary by comparison, also rolled around him, to shape the horoscope of his natal days, and to charm his fancy with imaginings of music of the spheres, while comets and eclipses served no other purpose but that of portents and presages of his fate. Science has, certainly, if it has done nothing more, accomplished a good work in taking man down a few pegs in his own estimation. He is still, even in the midst of a leveling civilization, sufficiently puffed up in his own estimation; but he is now modestly itself compared with his former self, although he is far more worthy. It is comparatively a mere trifle to culminate as he now does in mutual admiration societies, in English, French, German, New England, and other dinners, where he worships himself through his forefathers. At least, he has happily lost the supreme arrogance with which he once perched on the summit of things, and crowed his contentment at having reached the pinnacle, for he has now set himself to learn what he thought he knew.

The perception of evolution of all existing things is ever obscured through lack of perspective. Happy would it be, however, if such parts as are faintly visible could be viewed and described as they seem, without the everlasting suspicion that its portrayal indicates desire to praise at the expense of the present the times that are past. To declare any one a praiser of by-gone times is supposed by the unthinking to constitute an unanswerable argument, praise of anything that is past being supposed to convey disparagement of everything in the present. Of such airy nothings are the words which often present themselves as reason. But let it be noted that, to deride one who praises things of the past, as compared with certain phases of the same things within the present, implies that, in all things, at every period, the world has progressed up to that point in everything, and never has in anything retrograded, and this is an untenable proposition, as can be proved by the single instance of the 'Dark Ages, covering a multitude of retrogressions. A bird's-eye view of present civilization, while it shows us an aggregate of wide-spread liberality of thought, and of tenderness for the weak and oppressed and suffering, and of individual and organized effort for succor and relief, shows us also at the foundation of society a weakness of principle in financial matters unknown within historical times, and simultaneously a loosening of the family tie, associated with an erotic license with which, whether as cause, effect, or concomitant, it goes hand in hand. If it be ever possible to reach perception of effect as derived from cause, it would seem here as if the greatest of all the agencies at work, amid the multifarious ones that go toward producing any effect, is the sudden influx of wealth and luxury to thousands of persons, who, reared in penury, or in the most modest circumstances, could not safely reach at a bound suddenly changed conditions. Although not generally recognized, here is plainly to be seen the working

of the law of the survival of the fittest, for luxury has its victims from prodigality of all sorts, in health and money, who go down in the battle of life as surely stricken as in war.

At a time when the greatest general sense of justice that has ever been exhibited is engaged in ameliorating the condition of the poor, declaring that the laborer is worthy of his hire, and philanthropy, going beyond this, seeks to educate him, and to succor him when needy and when sick, the laborer himself, in instances so numerous as to tend to repress the sympathy which has gone out toward him, makes claims and demonstrations of force which have on occasions paralyzed the industries by which he lives, and withdrawn from the coffers of the State moneys for whose reimbursement he must contribute from his scanty stock. In this country, America, where the shoes in which men walk freely are so big that they never pinch, even organized anarchy has presumed to take disruptive part against a governmental scheme which it had not part nor lot in framing,—a governmental scheme which professes to permit to every man to become that to which he is entitled by nature and his own deserts.

In this democratic America, where only a few years ago the tail of the British lion used to be twisted on the Fourth of July and other high-days and holidays, and the public prints never tired of descanting on effete European monarchies and the absurdities of titular rank, valuable invoices of American girls yearly go to supply foreign needs, so that the day may come when the New Zealander, sitting on the broken arch of London bridge to view the ruins of St. Paul's, may find among the neighboring drift a stratum rich in specimens of an extinct female American type, associated with collapsed money-bags, while the opposite shores of the Atlantic may show contemporaneous deposits of banjos and microcephalous dudes. These, mingled with crania evidencing a highly-intellectual status of

present dwellers on the soil, will be the puzzle and despair of the future geologist to account for their presence in the midst of an evidently advanced civilization.

The family which, in modern society, is the pillar of the State, weakens, while the State, democratic, republican, or what not, goes on toward centralization of power, and tends, by becoming more and more paternally protective to the individual, to render him less independent, and consequently less free. The unthinking masses, while clamoring for all that government can give, little think that they are bartering away their birth-right. This is a recession from better principles, and looks backward toward Greece and other ancient countries, where the individual was merged in and had no other existence than for the State. It is difficult to see it as a healthy sign in the State, when government is like a gambling scheme, where in defeat or victory the chief gain is not for the people, as against the owners of the bank. The times of Louis XIII were not pleasant for the people; the king was really the State long before Louis XIV proclaimed it; but they were, at least, consistent in not pretending that government signified anything else than that the people should be despoiled. If one must be ruled by tyrants, instead of by the people for the people, better than a bloated tribune is kingly prerogative amid the pomp and elegance of a court, for nothing is more terrible than vulgar tyranny.

It is thus seen that it is absurd to say or imply, at any period of the human race, that all things are everywhere, in every respect, better than they have ever been. We must be able to recognize the fact that, in the moral world as well as in the organic and inorganic worlds, evolution is an unrelenting process, and, as represented in any individual place, may be progressive or retrogressive.

All that we can intimately know of the effects of evolution is comprehended by earth, and here we perceive general progress,

not only in the intellectual and the moral, but also in the physical, world; but if we are observant we ought also to see retrogression and apparent pause, according to the rhythmical law to which all things are subject. The great moral advance, regarded as a whole, that has been made on earth is to be frankly acknowledged. But do not, therefore, let us stultify ourselves through self-satisfaction, by proclaiming, in the face of facts, that we are better than we are, in all respects better than our immediate progenitors. Let us, however repugnant to our self-love, recognize that if we have got rid of some of their vices, they possessed some virtues in which we hardly equal them, while at the same time it is permissible to us to take credit to ourselves for a comprehensiveness in the lines of our advance which they never approached.

It is thus perceived that not in the physical world alone, but in the mental one also, as represented by the individual, family, social circle, and nationality, development in infinite directions, in the present era generally upward, continuously influences life. The force at work acts in obedience to an unremitting natural law, controlling all physical, mental, and moral affairs, not only on earth, but, as we have reason to believe, throughout the whole universe. The only apparently modifying influences to its action on earth are the intelligence and the will of man; but these are not antagonistic influences, for they, too, are factors in the grand total, contributing their quota to the consequences of the working of this universal law. Controlling all being, it necessarily includes health and beauty, and all else that appertains to mankind.

CHAPTER VII.

THE SENTIMENT OF THE BEAUTIFUL.

HALF the arguments in the world arise and persist, because each side does not know exactly what the other is driving at, and very nearly the other half, because one does not itself know. With this solemn warning before us, an instant's thought will be well taken to reach an agreement as to what is to be here understood by the term *beauty*. In this best of all possible worlds one can never tell, unless personally acquainted with his interlocutor, at what tangent he may go off. It has even happened, when the question of beauty was on the tapis, that some one has asserted that the supremely good is the supremely beautiful. This is worse than puerile, for we know nothing of perfection of any sort except as a transcendental idea, and our notion of perfection in morality, as expressed in terms of the beautiful, is only figurative, a notion derived from our constant comparison of objects of beauty in the sensuous order of things. To do this, therefore, is to be guilty of the absurdity of attempting to define the unknown in terms of the unknown, and not only that, but the unknown in terms of the unknown in an entirely different category, confounding the sensible with the supersensible world.

What is here intended to be understood by the term *beauty* is the beauty that is recognized by the senses, sensuous beauty; and although the touch has had its share in educating that perception, reference is here to be made solely to the beauty which is perceived by the eye. The limitation must be made still more strict, and therefore it becomes necessary to say that, although occasion will presently arise for using illustrations which do not apply to personal beauty, yet it is to personal beauty, as our

ultimate objective point, that the attention of the reader is directed.

Here one without experience would suppose that all possible stumbling-blocks to agreement would have been swept away; but not so, for there are persons who have contended that beauty does not exist in any object, but is in the eye of the beholder. The argument used in favor of this view is that the taste of individuals, from the savage and barbaric to the civilized, varying so enormously as to what constitutes beauty, proves, by the absence of a general criterion for excellence of the thing, that the thing itself cannot exist. But as a parallel argument in other matters would be regarded as entirely fallacious, it is strange that this should ever have been advanced as a valid one on this subject. For if there is anything which is recognized by the enlightened races of mankind it is the difference in quality of mentality in range from the civilized and enlightened to the savage and barbaric races. Would any one presume to say that there is no difference between the music of a Beethoven, a Mozart, or a Wagner and the tomtoming and banjoing of a savage composer; that the difference lies merely in the ear of the listener? Why, Helmholtz has shown not only the cause of the difference between a musical note and a note that is a mere noise, but has also shown what it is among musical notes themselves that makes difference in the quality of sounds!

All educated persons are agreed that that being which is physically most highly differentiated, that being in which there is the greater division of physiological labor, is, relatively to another being not so highly differentiated, the superior. The principle is the same, whether we consider the structure representative of a faculty, or we consider the faculty which may elude revelation in the mechanism of a structure. The principle declares broadly that that which is most highly organized has the highest perceptions. The Germans, to continue our illustra-

tion, possess, as a race, the highest musical faculty among mankind, and next come the Italians. Other civilized peoples have enough to enable them to appreciate the fact, but the savage cannot rise to the perception of even the lowest civilized form of the manifestation of the faculty. Is there no sensuous beauty because a man born blind cannot see it? Is there none because the mentally purblind, through only partial recognition of it, differ in criterion from those who are mentally more advanced?

It has been truly said that no one can see Greece unless he takes Greece with him; that is, unless his mind is so imbued with the ancient literature and life of Greece that he thus has acquired an insight which no ordinary man can possess. So, too, we may say of all perception in nature and art. Race, mental ability, culture, opportunity for comparison, all that goes to make difference between man and man, goes also to make difference of taste in beauty. Beauty remains the same, while taste differs indefinitely. But taste does not differ more than does mankind. Given similar faculties, physical, mental, and moral, and the same surrounding conditions, and taste in the beautiful would be similar among mankind. It would never be exactly the same, even in any one community, for every man brings to his feelings and his judgments his own identity and life experiences, which can never be exactly like those of any one else; but the criterion would be essentially the same, which is all that is contended for in attempting to show that the absence of a world-wide criterion is no valid argument against the intrinsic existence of beauty. It is not that beauty does not exist that men differ about it, but because they themselves differ in organization and in all surrounding conditions, that there is no universal criterion for it. One of the best evidences of the correctness of this view is that the world, assimilating more and more through modern travel, is, despite its complexity, becoming more and more uniform in taste.

Observe the bearing of another consideration upon the truth of this conclusion. The earth has evidently not changed in scenery since ancient times, and yet it is admitted by all competent judges that love, and therefore presumably knowledge, of the picturesque belongs only to the moderns. The view is doubtless correct, although there is a tendency to exaggerate it. It is difficult to believe that the Greeks, a race which peopled every lakelet and stream and wood with nymphs; which had its grottoes, groves, fountains, and mysterious caves; the race in whose contests the gods themselves took part, the canopy of heaven, the earth, and the Plutonian regions the scene of their exploits, should not have been gifted with some love for the picturesque, as we know them to have been supremely for the beautiful. And coming closely in their footsteps on earth were a people who are seen in the sunburst of art which shone from Christianity to be so highly gifted with the sense of the picturesque, that we cannot suppose them to have been suddenly endowed with it as a concomitant of the new faith. All that can be said with certainty is that the love of the picturesque, to the degree in which we now perceive it to be manifested, is an essentially modern development. Whence comes the fact, nature having remained essentially the same, that nature must contain the beautiful independent of the seeing eye. Certain grand expressions in nature have been, as the record shows, appreciated from the earliest times, when men left their impress in literature. Yet it remained until quite modern times for men fully to perceive the picturesque,—one of the phases of the beautiful.

What constitutes the picturesque has long been fruitful matter of discussion. Ruskin ascribes it to ruggedness of line and surface, and some other writers to perception of decay. That neither of these views is tenable can easily be settled by any reader for himself by many illustrations that can be summoned from his own experience. That the picturesque is often

associated with broken lines and surface, and also with ruins, taking decay in that sense only, is undeniable; but that these elements are essential to it can be disproved by the commonest observation. A pretty girl may be highly picturesque, and surely she has nothing about her like broken lines and surfaces, or ruin and decay. We have ourselves seen, in an old orange grove planted by the early Spanish settlers in Florida, and grown wild with arching and interlacing boughs, a high exemplification of the picturesque, when surely the lines and surfaces were not markedly broken, and the luxuriance forbade the idea of ruin or decay.

In fact, despite what Ruskin says of himself,—that he never enjoys nature so much as when perfectly wild, remote from suggestion of the presence of man,—it is not clear that he does not deceive himself when we recall that scenes in which the idea of the picturesque plays the greatest part are suggestive of the presence of life. It is to the point of the picturesque as a phase of the beautiful that reference is made. Undoubtedly, there are many scenes on earth in which soaring, snow-clad mountain-peaks blend with the sky in amethystine tint, where the beautiful is engendered in association with the grand, the awful, or the sublime. But it is not of the beautiful or of blended effects that we are speaking, but strictly of the picturesque. It would be well, in passing, however, to note that even in these it is still life that is summoned before the mind, only that, in this case, it is not life animal but life spiritual that rises into view.

The picturesque, on the contrary, relates only to earthly life,—the pleasant highways and byways of human existence. One could not extract a sentiment of the picturesque out of a landscape on the moon. Wide expanse of plain would set off craggy escarpments of mountain ranges in the portentous light and shadow of a region without atmosphere. Over the whole waste, blasted by alternate heat and cold, would be no sign of

life, nor blade of grass, nor smallest living thing. But suppose, instead of that, we choose for our scene the Rhine. Project into it a bold promontory, rising high above the stream. It presents form and color, light and shade, and yet something is wanting to the completely picturesque. Crown it with a castle, a monastery, or with a simple hut, and it becomes more picturesque, because the association with life becomes more extended. And so it will be found true of the whole sphere of the picturesque. Why should the Rhine be more picturesque than the Hudson, but that its shores have been associated with the life of barbaric and civilized man for centuries?

If the picturesque has now been satisfactorily demonstrated to exist, from having been shown to be a discovery of comparatively modern times, no one will be prepared to deny the real existence of that which must include it—the beautiful.

The beautiful, being an ideal, excludes the presence of criticism. But as, of course, there is, in reality, so far as human experience goes, nothing ideally beautiful, we are constrained to speak of that which we know as the nearest approach to our ideal as the beautiful. With this understanding we may define the beautiful as that which gives to contemplation unalloyed pleasure.

The average human being, adult or child, has far greater capacity for synthesis than for analysis, and hence it follows that he is constantly mistaken as to the character of his emotions. In point of fact, so difficult is it from the complexity of feelings to analyze them, that the majority of the world is constantly deceiving itself about what it imagines itself to know best. Pictures of weirdness, power, awfulness, or sublimity are constantly supposed to be revelations of beauty pure and simple, whereas the emotion experienced is often shown by its source to be highly complex, compounded, on some occasions, far less of beauty than of other elements. The imagination is excited by

many things besides beauty, and the mind often experiences under the stimulus an exaltation derived from sources in which beauty is quite subordinated. Nowhere is this error of judgment so palpable as when shown in expression of admiration for the beauty of the dead. Death is so repugnant to life, that the dead cannot be beautiful. The emotion excited in the mind, especially by the dead who have been loved, clouds the judgment as to the character of the emotion experienced. With the lost lines of petty care, the face sometimes assumes an expression of nobility, nay of majesty itself. But the satisfaction thence derived is not from the perception of the beautiful; it is because the sublime has entered upon the scene. Needless it ought to be to say that this awful sublimity is incompatible with expression of the purely beautiful. The real character of the sentiment awakened by the presence of death was never better expressed than in the lines of Burton :—

Here lies a common man. His horny hands,
Crossed meekly as a maid's upon his breast,
Show marks of toil, and by his general dress
You judge him to have been an artisan.
Doubtless, could all his life be written out,
The story would not thrill nor start a tear;
He worked, laughed, loved, and suffered in his time,
And now rests peacefully, with upturned face,
Whose look belies all struggles in the past.
A homely tale; yet, trust me, I have seen
The greatest of the earth go stately by,
While shouting multitudes beset the way,
With less of awe. The gap between a king
And me, a nameless gazer in the crowd,
Seemed not so wide as that which stretches now
Betwixt us two, this dead one and myself.
Untitled, dumb and deedless, yet he is
Transfigured by a touch from out the skies,
Until he wears, with all-unconscious grace,
The strange and sudden Dignity of Death.

In short, the beautiful is that which, whether in nature or art, possesses perfection of parts harmonized by unity. The picturesque, on the other hand, is that lower degree of beauty

which, although lacking unity, still possesses such pleasure-giving elements as to gratify the eye. Is it not undeniable that the picturesque is more soft and tender in its action upon the sensibilities than is the purely beautiful? Is not the beautiful, as nearly ideal as we know it, still a thing so cold and lofty that it does not affect to tenderness as does the picturesque? Painless perception must be, as little complex as is possible, for them to represent truly the beautiful and the picturesque.

Having now discussed the principal traits of the beautiful and the picturesque, it will be the most gallant thing to reserve for the following chapter the subject of the beauty of the fair sex.

CHAPTER VIII.

THE SOURCE OF THE BEAUTY OF THE FAIR SEX.

WE wonder if it has ever occurred to the reader to imagine why the female sex happens to be the fair sex. If, however, he or she has read attentively the second chapter of this work, at least a shrewd suspicion must have been awakened that the difference might be derived from the continuous action of sexual selection.

It may be asked why it is not the male, as shown in that chapter with reference to the lower animals, but the female, among mankind, which is the handsomer individual of those representing the sexes? To answer that will require study of the differences in the lives in question, and in the conditions by which they are surrounded. It was shown in that second chapter, through a sketch of the amatory lives and habits, principally of gallinaceous fowls, that the law of combat chiefly determined the most successful mating, and therefore, incidentally, the transmission and enhancement of certain male attributes to the males of the brood. Health and strength, as was indicated, are the necessary bases of courage and beauty. It was, therefore, remarked that, in the long run, these latter must necessarily predominate in the broods of successful suitors, who, in turn, in the competition with others not so highly endowed, would be more certain than they to transmit their attributes in increasing excellence to their progeny.

The preference by females among these animals is not exercised in the same way as among human beings. The male, as belonging to a species of the lower animals, is, as he is not among the higher races among human beings, unrestrainedly impulsive in sexual attraction. Through that impulsiveness he

is, in the state of nature, the chooser of one or more females, not so much as individuals as belonging to the aggregate of females whose presence excites him to jealousy and battle for the possession of what may, so to speak, be called the female element of nature, irrespective of individuality. In a word, the male, in a state of nature, takes a female or females, largely as such, and cannot, in the highest sense, be said to select them. As among the males, however, there is the sternest competition for females as such, leading to fighting, to the wounding, defeat, or death of adversaries, and as preference among the females for the attributes possessed by the victors is inseparable from their falling to the victors as the reward of their strength, skill, and prowess, any beauty which is in the individual victor, associated in varying degree with his pugnacious capacity, comes to be more attractive to the female, appreciated, and reproduced by her. It is transmitted by her chiefly to the male portion of her brood (for it is of male attributes of which we are speaking) and becomes intensified from the same causes in successive broods. And hence it becomes apparent how the female among such birds, and relatively among animals generally, remains comparatively unadorned, while the males among them constitute fair sex.

Now, analogous causes have been, under entirely changed conditions, instrumental in bringing it about that, among mankind, the female, and not the male, sex is in many places the fair sex. The female sex is not invariably, even among mankind, the fair sex. Among savage peoples the women are, save a favored few belonging to a king or chief, repressed to such a degree that the men are invariably better favored in face and form. With all the physical disabilities of the sex, savage women do the drudgery of the tribe, and, even when the men are on the march, are compelled to bear a full share of exhausting labor. Child-bearing and the cares of maternity, added to this

weary life, leave no margin for the acquisition of beauty. They are even without the stimulus of the tenderness that gives strength. It is the testimony of African travelers that they never saw a negro caress or bestow the slightest endearment upon a woman. The women, bought and sold, are mere beasts of burden, and, without being always slaves in name, are so in effect to their lords and task-masters. Among the Indians of this continent the same conditions have prevailed from time immemorial. The men have been, as they are in Africa to this day, warriors and huntsmen, disdaining labor, who have shifted the toil of daily life upon the shoulders of their women. Hence it has come about, from two causes, that the men are physically superior to the women. Athletic exercises taken in the open air, especially when not pursued as such, are the most conducive of any to physical development and lustiness. The women naturally accept the protection of the strongest and bravest of the tribe whom they can secure, and as these would not accept any but the most desirable, this, with the other cause, combines to make the men who survive as the fittest, the superiors of the women in physical endowments. Savage women, therefore, with the exception noted, never are nor can be, relatively to the men, regarded as the fairer sex. They are quite in the position, with regard to the other sex, of the lower animals. What is so touching about Millet's peasant women?—the revelation of grinding toil by their rounded shoulders and resigned faces. This same pathetic thing represents the lot of most savage women, except in those parts of the earth where nature has been so bountiful, amid strife which is not constant, as amply to supply the simple wants of the people.

The complexity of civilization represents conditions radically different from these. Amid them, the agencies described reach apparently, but not really, fundamentally different results. The multiplicity of details obscures perception of the

fact that, the causes at work being the same, the effects will be the ones to be expected under the modified conditions. Among the higher races of mankind the female sex has become the fair sex simply because men have combined to make it the fairer. Wherever possible these races have sought to relieve women almost entirely of labor. Whole classes of women among them have nothing to do that can be called labor, let alone toil. Many individuals among them are mere human butterflies, flitting from flower to flower, with no more exercise than sufficient to enable them to sip in quickest succession the sweets of life. That this is for their best good, without some ballast for their airy flight through life, is not the question here; it certainly is conducive to beauty. Fresh air, exercise, the best food, and the revivifying influence of constant change, they have; and while these directly promote beauty, the absence of care is the greatest cosmetic in the world.

In this complexity of conditions represented by the highest civilization, the pure and simple attraction of the sexes for each other is dominated by many causes known in but slight degree, if at all, to primitive men. Even in the United States the conditions of sexual relations are becoming more and more complex, as time goes on and the country matures. The time was when they were almost of pastoral, bucolic simplicity. The time was, only about forty years ago, when rich men, as rich men for their day as other men are rich for the present day, lived and died unknown. Now, almost the world over, no matter what an old hunk a man may be, it is enough for him to be rich, to be great. The idea of wealth, the idea of the desirability of wealth, has more or less pervaded all ranks. The resulting social condition reminds one of the replies of Dumas's Jew to the questions of the High Chancellor of France: "What is your name?" "I am worth twelve millions." "What is your age?" "I tell you I am worth twelve millions." "Your

profession?" "Why, do you not understand? I repeat, I am worth twelve millions."

This commercial spirit of the times, or rather the contempt for the shop associated with love of its profits, has affected nothing more in civilized countries than the relations of the sexes, has introduced considerations of money into marriage, and has intensified that condition abroad. Even collegians and school-girls may be heard nowadays calculating their material chances in the money market. Worthy considerations as these are, when kept within bounds, they have now reached a point where they are often too influential in determining choice. Despite all interests, however, romantic love sometimes seizes two creatures in a whirlwind of passion and raises them to the skies.

In addition to the signal and undeniable fact of the change mentioned, is the other, more potent, overruling, and perennial fact, which more largely than any other influence determines marriage and the increasing beauty of the female sex, through the selection by men of those most agreeable in person, to the neglect of others. The love of the beauty of the female sex by the opposite sex is proved not only by choice being more largely determined by that than by any other element; it is proved also by the sedulous care with which men of civilized races guard their women against the hardships which are prejudicial to beauty. On the contrary, the normal woman, advanced beyond the bread-and-butter age, cares little for male attributes, except such as indicate strength and courage, such as constitute manliness. The men of the higher races have, from the earliest times of which we know anything, worshiped the beauty of the other sex, and that sex has complacently accepted the tribute to its charms, as why should it not? Men's preference, therefore, having always been for those individuals of the opposite sex whose beauty was greatest, the result has

manifested itself not only in wooing and wedding, but in the inheritance, in ever-increasingly greater and greater degree, by female offspring of those physical attributes which made the mothers attractive. All this implies romantic love, relief from burdensome labor, and freedom from the care of providing subsistence for the family; all of which, as has been shown, are conditions favorable to the creation and conservation of beauty.

The dissonance produced by absence of beauty-producing conditions, when the forces just described are in abeyance, is exhibited by the characteristics of strong-minded women. With them the natural play for the instincts and emotions and energies of the softer sex having been denied, they make an order of beings apart from the attributes of either, but pertaining more nearly to the male than to the female sex. Sexual selection has generally stood them aside from relation to posterity. They are, for the most part, like the exceptional species of which mention has been made, where the female is the pugnacious element of the conjugal bond, wears the comb, spurs, and hackles of the opposite sex, and they are, when wedded, like similarly situated individuals of that species, in being followed by a crest-fallen mate, distinguished by feminine traits, who brings up the rear of all things in the battle of life.

It follows from what has been said that, if the character of the higher races does not change, and the physical conditions on earth do not change, and it is improbable that they will change for at least some millions of years, the beauty of women will go on increasing for a long time to come. Ease and comfort, as a whole, enjoyed by civilized peoples, have greatly increased all over the world within a hundred years, and as they are likely still further to increase, beauty will, through men's admiration of it, combined with these favorable conditions, go on increasing in amount and degree, and become proportionally prized. Summing up all the agencies at work among the higher

as fruitful of increase of female beauty, we may well assume its further great development. These influences are men's devotion to it, women's lessened labor and care, their higher education, and their social development. These conditions must produce in turn romantic love, vigor of body, and maintenance of youthful appearance, amiability of expression, and the intellectual and spiritual graces of the countenance; all of which, in the aggregate, will mean increased beauty for the future.

CHAPTER IX.

THE EFFECT OF ENVIRONMENT AND TRAINING ON THE PHYSIQUE.

IT will probably appear to the reader as if it would be impossible for any marked change to take place in the human form during the short space of even the longest life-time. But, happily, the fact can be readily established by examination of probably the largest body in existence of accurate statistics on any one subject.

After the great civil war in America was over the government of the United States made a compilation of remarkable surgical and other matter, and collection of interesting and useful military material used in the war. Only one class, however, of that statistical information is that with which we have special concern. It must be remembered that, as the information was derived from investigations relating to a body of men numbering over a million, the idea is precluded of the error involved in generalizations from a few cases. The object of the introduction of the obtained information here, and some other which will follow, is to show that, if certain existing but not imposed conditions have produced determinate results on the body, then we have it in our power, by voluntarily imposing the same or similar conditions, to reproduce like results.

It was ascertained that, although the sailors enlisted in the war were, as a class, shorter than the soldiers as a class, their legs were longer than those of the soldiers by over $\frac{3}{4}$ inch. Their arms, on the other hand, being over an inch shorter than those of the soldiers, were disproportionately short as compared with the soldier standard, even after making due allowance for the difference in stature between the two classes. The sailors measured more around the neck and less around the waist and hips

than did the soldiers, and the sailors had higher insteps than the soldiers had. It was also discovered that men who had been born and bred in the Western States were taller than those born and bred in the Eastern States, and that residence in cities was prejudicial to height.

Some of our readers may be of sufficient experience to be able to make reflections for themselves on the basis of the points which have been noted. But, assuming that all have not that experience, it will be well here briefly to discuss some of them. The differences between the sailors and the soldiers could not have arisen from changed conditions during the war, for measurements are made upon enlistment. The facts are very striking, however, taken as they stand, showing that difference of occupation, with a slight infusion of heredity, can produce such differences. We say a slight infusion of heredity advisedly, because such is the shifting of occupation in modern times of son from father that there are rarely now, as formerly, occupations engaging even two successive generations of a family. The son of a sailor or of a soldier may be anything else, and is more likely to follow some other occupation than that of his father. The soldiers of whom we are now speaking were, at the time when they enlisted, not soldiers at all. At that period of time they represented merely landsmen drawn from a wide extent of country, and, to a certain degree, from different nationalities. The comparison, as it stood, was therefore simply between sailors, who are necessarily professional, and landsmen, who at that period were not soldiers nor at any subsequent period professional ones, though many became veterans as fine as any in the world. Each class therefore had acquired, more especially during the youth of its component individuals, characteristics which represent, in a general way, the aggregate effect on the body of occupation on land or sea.

It was observed by every one during the war that, excepting

where the Confederates were pitted against Western men, their infantry generally outspeeded the Union infantry in marching. Now, although one obvious reason of this was that they marched with less baggage, there is still a large margin to be accounted for by the assignment of some other cause. It seems to us that familiarity with the physique of the Southerner as compared with that of the Northerner explains the difference, the former being long-limbed and spare compared with the latter, and on that account being able to beat the soldiers of the East in marching; while he found his match, in that respect, in the soldiers of the West.

The difference between the Sioux and the Apaches in the character of their development has such relation to their physical surroundings and habits, that it makes one of the best possible illustrations of difference of form produced by different conditions. The country of the Apaches is not adapted to riding: the country of the Sioux is. The Apaches have but few horses and are not known as riders, while the Sioux are among the finest riders in the world. The Apaches are long-legged, spare, and lithe, and indefatigable on their feet; while the Sioux are comparatively short-legged, are not addicted to pedestrian exercise, and ride like centaurs. An officer of the regular army once described to us a fight which his company, guarding a supply-train, had had on the plains with some Sioux seeking to capture it. The train, closing up to make as short as possible the line to be defended, passed slowly and steadily along, the soldiers taking shelter in squads within and without the wagons, while from various directions troops of savages came thundering down upon them, discharging their missiles, receiving the volleys in return, rescuing their wounded, and wheeling away only to renew their onslaught. On the wide sea of the plain, under the glittering sun, the slowly moving, stubbornly defended train, the masses of horsemen whirling around it amid the crack of rifles, pre-

sented a ravishing spectacle of contrasted movement, in which circled the splendid horsemanship of a thousand mounted warriors.

Generation after generation these braves had ridden, so that, like the Arabs, horse and rider had come to be almost as one. On the other hand, the Apaches, generation after generation, have wandered afoot through the fastnesses of their region, sometimes on forced marches of almost incredible severity, in which women and children as well as men share. Hence, Sioux and Apaches have acquired physical attributes strictly in accordance with the physical conditions surrounding them. The Sioux, big-chested, robust, and comparatively short-legged; the Apaches, long-legged and wiry in form, illustrate the chief differences of those conditions.

A striking change in physique, accomplished within a brief period, always ensues in the average man after having been for some time subjected to military drill. If at the point of departure he happens to be a veritable rustic, he becomes a different being. The bumpkin is a slouching, shambling, round-shouldered wight. He is not, as are generally the city-bred, constrained by a certain degree of public requirement; nor is he, like them, rigidly subjected to a large amount of insensible imitation. Nevertheless, he has in him the making of a man, and generally of a physically better man than the city born and bred. What he needs to make him look like, as well as be, every inch a man is simply to be "set up" by drill and discipline. In countries where the relations are just between officers and men, he there, as the common soldier, often undergoes through drill a favorable change in physique and a higher tone through discipline. The results produced by these combined agencies is transforming. From a shuffling lout, who does not know how to use the limbs which nature has provided him with, a man issues forth whom his nearest of kin can scarcely recognize.

Where discipline and drill are not obtainable, some kind of manual and evolutionary movements are always possible, and for the latter dancing is far better than nothing. One need not be a specialist in anatomy and physiology to see that the great changes indicated are not produced without profound alterations in the structure and functions of the body. The rounding shoulders are thrown back, the shoulder-blades disappear, and, the chest expanding, the lungs inhale deeper draughts of life-giving air. The limbs, especially the legs, move with greater freedom within their natural bounds. The hands become more pliant, adroit, and serviceable. Beyond all that can be thus specified as acquired, is co-ordination of parts in prompt obedience to the directive mind and will. This makes the distinctive difference between the halting hesitancy of mind and body in the bumpkin, and the alertness of mind and of bodily action in the city-bred.

An officer of the regular army once told us that when he first went to West Point he was a strapping, awkward youth, so knock-kneed that, standing, he could not put his heels together by 2 or 3 inches. In the course of a year or two, however, he said, his legs had become perfectly straight through the influence of foot and horseback exercise. We can, from personal observation, vouch for the accuracy of his observation that his legs had become straight, for their symmetry was so admirable as to be remarked. There once came under our direct observation, in a boy of from 12 to 14 years of age, such a change from being awkwardly high-shouldered, to his shoulders being rightly placed, that the change seemed marvelous; but it was only a phenomenon of development under favorable conditions.

Of course, similar influences to those which favorably affect the form in the male sex affect it also in like manner in the female sex. Not only are the acquirements of each, except those which are distinctively sexual, transmitted through

progeny to both sexes, but the general conditions which produce peculiarities in the individuals of one sex occupying a certain locality produce them also in members of the opposite sex occupying the same locality. In the last paragraphs the figure and shambling gait of the bumpkin have been spoken of exclusively, because, in connection with him, it was desirable to illustrate the effect of drill and discipline. But, whatever applies to him and to others of his sex applies in essentials also to corresponding individuals of the female sex, although in less degree, because the love of pleasing leads among women of all ranks to some abatement of the condition of partial or complete indifference to attitude and movement.

In the first chapter we have spoken of the singular abstinence among country people in America from exercise afoot. In the present connection it is in place to emphasize the fact that all that applies to the men in regard to posture and movement, as being conducive to health and beauty, must apply to women. As, however, the next chapter is to be devoted especially to the movement of women under the appropriate idea of grace, it is necessary here only to remark, before resuming the theme of change of form within limited periods, that the sole difference in the applicability of what is said on these topics lies in the necessary modifications in practice appropriate to sex. If men drill, so should girls drill, through calisthenic exercises, including especially the cotillon of various kinds. All calisthenic movements executed to music necessarily have a rhythm which cannot otherwise be obtained, the bodily movement being the visible presentment in time and motion of the unseen influence. Description of what constitutes good walking is also deferred to a subsequent chapter. Walking, to be good, requires practice, as we see in drill, not with the object of getting over ground, but of getting over it properly, so that locomotion shall eventually become through habit more graceful and effective. One of

the best methods for women to learn to stand and move gracefully is in the drill effected by such dances as the minuet, formerly called the *minuet de la cour*. The modern dancing-master, descended from the high authority which he once enjoyed, teaches little but his inefficiency. If he can get two young people to jiggle and tumble around a room together in the waltz, he flatters himself and his pupils that mortal man can do no more for social grace. The old-fashioned dancing-master taught them to walk, to bow, and how to enter a room. His only omission was in not telling them how to get out of it, which is a feat so much more difficult, that hosts suffer to this day from its inadequate performance. Although a person would be as great a fool to abide implicitly by the teaching of a dancing-master as to dress by the taste of his tailor, and good society never did nor will do either, yet it is only by exaggeration of movements that the true eventual movement can be learned, the "goose step" leading to good marching, and the strutting of the minuet to the graceful movement of a lady; for, as Pope says, "they move easiest who have learned to dance." They cannot move easily unless they hold themselves well, and hence posture is indispensable to the art of dancing, which, in its two branches, posture and motion, is intended to pervade the future life in healthful ease of movement.

To resume the theme of change of form, intermitted during this necessary digression, we would remark that one of the most striking illustrations of which we know, of rapid physical change, brought about by changed conditions, was that witnessed soon after California began to be settled by the people of the United States. In 1859, San Francisco was removed only ten years from a time as celebrated as the Argonautic search for the golden fleece, from the time when the men who still proudly call themselves "the forty-niners," were in the ascendant in California. At that time San Francisco had scarcely departed

from the aspect of those very modern but apparently remote days which Dana described in his "Two Years Before the Mast." It had been burned down twice, and had arisen from its ashes each time improved. By some few years it had become, in 1859, a city like any other of America, as well paved, lighted, and otherwise appointed for comfort. There adventurous spirits of all sorts, from men who had money to invest to those who had nothing but muscle, had congregated. There, on the streets of San Francisco, the lavish Southerner, the penurious Yankee, jostled each other, while the Chinaman scuttled along, only too happy to escape to his quarter unmolested. An entirely new condition of affairs surrounded most of the denizens of the place. Views were enlarged, sympathy and helpfulness were unstinted, generosity was unbounded. Men who had been brought up in the narrowest way expanded, body and soul. The new generation showed the greatest possible physical improvement. Under an equable temperature, in the enjoyment of out-door air and exercise, the young generation had such arms and legs and trunks as their progenitors had never dreamed of, and this, the blood being the same, came about from simple change of conditions. The changed conditions were numerous, it is true, but so it is always, change of only one or two conditions, with change of region and climate, being inconceivable.

All observers agree that it is absurd to think of the English as being in physique as they were personally well known to our forefathers to be, and through pictures almost equally well known to us to have been. The broad-visaged, bluff Englishman is a variety of man which has rapidly disappeared. The exigencies of modern times, with their requirements upon the nervous system, have made and are continuing to make of him a type more nearly approaching the American than any other. The same effect, from the same and additional causes, is to be seen in France. The type of the *haute noblesse* has almost disappeared,

and with it the air of distinction. The tendency in expression everywhere is toward that of the *bourgeoisie*. Except in the remote and exclusive atmosphere of the Austrian court, distinction of air and manner has largely disappeared. It is notorious that it does not exist in Prussia, except in the military form. It is everywhere disappearing, if indeed it is not gone already, engulfed in the commercial activity engendered by the democratic spirit of the age.

Look at the case of the prognathous, or projecting-jawed, emigrants who often land in New York. They represent the last term of a long struggle for existence, in ignorance, dirt, foul air, ill-housing, and overworking for generations. They find themselves in quite changed surroundings. The law of natural selection does not work by set times for a given result, an age being sometimes required for a change which at other times a few years may effect. The reaction of the organism to the surrounding conditions must be taken into account. In this case the relation of the organism to the external conditions results in rapid change. It takes place with marvelous strides. Such emigrants often become within the remainder of their life-time so bettered as to be hardly recognizable, and leave to their children an inheritance of good-looks which never had previously appeared in the stock.

We see the Chinese mostly as laundrymen, and elsewhere in this country they are known as that and also as the pickers-up of unconsidered trifles, and in all places are seen with somewhat changed habits. Where, however, the Chinaman is of a rank not to go bare-foot, he generally wears the Chinese shoe. That shoe on the sole is about half an inch thick, with no more bend to it than has a pine board, ability to walk in it being secured by a change of the angle of the sole about two-fifths of the way from the toe. In consequence of this, Chinamen who have worn their native shoes for generations have scarcely any develop-

ment to the calf of the leg. Going slippered and booted as, among the lower classes, they are largely doing in this country, is for the first time enabling all those heretofore destitute of calves to procure them.

The most fearful thing in nature, a writer once said, is a ballet-dancer's leg and foot, with their stumped toes and abnormal muscular development of the calf. But there is one thing more fearful than that, in the change of nature by art, in the high-caste Chinawoman's foot. We once picked up on the parlor-table of a gentleman, who had lived twenty-five years in China, an ebony, life-size model of the foot of a Chinese woman of rank. A question regarding it led to an account by him of how he once, by means of bribery, had obtained sight of the horrible reality. A little girl's toes, except the great toe, are broken and turned under the sole of the foot, which is by that treatment and the following procedure arrested in growth. That procedure is swathing the foot with bandages, tightly compressed, with which the child pays agonized tribute to fashion for having been born highly aristocratic, continued by the further tribute of stumping on short stilts through life. The description of this horrible practice is mentioned here, for the bearing which it has upon the disease now known among us as "Morton's toe," and upon what is to be further said on the subject of feet, when we come to the discussion of feminine grace.

Enough cases have now been presented to elucidate the statement with which we set out, that change in the human organism may be so rapid as to be conspicuous even within the space of an ordinary life-time, and, therefore, that it often lies largely within our power to control its direction and amount. Upon the basis of matters which we have duly considered,—those relating to structure,—we can now best study those belonging to function, as exhibited by easy movement, and especially that form of it known as feminine grace.

CHAPTER X.

GRACE THE CROWN OF BEAUTY.

MOVEMENT may be in itself beautiful, and when so, and appropriately combined with beauty of the human form, it constitutes the highest conceivable beauty. So associated in the mind is living form with movement, and symmetry of the living form with exquisite movement, that a sense of deficiency is experienced if the movement does not correspond with the apparent requirements of the form. So intimately are they associated in the mind, that we feel the absence of due relations between them, even when the idea of movement conveyed is, as in the statue, only suggested by the counterfeit presentment of life. The colossal statues of Egypt sit grandly erect with their Atef crowns, but stolidly, and wholly unsuggestive of movement through all eternity. The Greek statues, on the contrary, be the portrayal of the human form never so reposeful, from the massive-shouldered, resting Hercules to the elegantly-limbed Apollo, through all the intermediate delicacy of womankind, everywhere suggest form energized by potential action, ready to deploy itself in manifestations of strength and grace.

It is movement that makes grace. When we say of a figure that it is graceful, it is not the figure itself which is properly thought of as graceful, but the effect which would be exhibited if only it should move. This proves how closely our ideas of form and movement are associated, when we actually transfer the complex perception of moving form to form alone. The conception from a perception is instinctively transferred to and identified with the figure itself, as its exclusive attribute.

If the reader desires to seize and hold firmly the principles underlying grace, it will be well, first of all, to consider that it

is not the exclusive possession of human beings, nor even of animate things generally, and that it is an element of beauty which may be absent from form otherwise beautiful. Everywhere, however, that it manifests itself, it is found associated either with life or with that which is life-like through presenting the appearance of life. Thus, we witness it in the gracefulness of a yacht under full sail, bounding over the sea. We need not go to Byron's line, "She walked the waters like a thing of life," to know, if we have ever seen it, how full of apparent life and purpose is the careening craft among the billows. Even the movements of a kite are manifestly life-like and graceful, resembling the soaring of birds. We find among the lower animals several kinds which are exquisitely graceful; witness, for instance, certain species of antelope and deer, and the species of birds to which allusion has just been made, as affording the high standard by which we judge of the movement of the kite. The horse, too, not as he sometimes appears, trained even to tricks, but free as nature itself, is of almost unsurpassable gracefulness, in his gathered form, arching neck, flaming or fearful eye, when he sometimes becomes an embodiment of grace and picturesqueness difficult to match.

It is, however, only when we reach the human form that symmetry and grace can be so conjoined as to be beyond comparison. This is said, of course, with due regard for the fact noted in the preceding pages, and to be kept in mind, that we are constrained to speak of that which most nearly approaches our highest conception, as the ideal, although, of course, the ideal is a conception beyond anything that we perceive. Even the Apollo Belvidere has been discovered by modern anatomists to be defective in the delineation of the muscles of the chest, and the equally celebrated, in its way, group of the Laocöon exhibits in the brow of the distraught father imperfection in delineation of the muscles which there represent the corrugations of despair.

With this continued understanding, therefore, it may be said that there are seen occasionally certain embodiments of perfect grace. It is almost impossible to conceive anything human more nearly reaching perfection than the symmetry and grace which Rachel presented in "Phédre." Every step seemed to flow naturally out of what preceded, her every gesture moved in rhythmical accord with the verses that flowed from her lips, while, robed in the superbly ample peplum of the Greeks, this high-priestess of the histrionic art moved a goddess on the mimic scene. In an entirely different sphere of grace, Ellen Terry, in "Much Ado about Nothing," where the line occurs, "Look where Beatrice, like a lapwing, moves close to the ground to hear our conference," thrilled the spectator by the sight of her agile flight across the stage.

Grace is fundamentally, then, beauty of movement in living or life-like things. It gratifies in the mind the associated ideas of accordance with each other of form and movement, and that condition best satisfies the mind which harmonizes the two elements concerned in the greatest unity of effect. We experience great pleasure at the sight of gracefulness, and corresponding uncomfortableness at the sight of intense awkwardness.

Looking at the effect from a mechanical point of view, and it is from that point of view which we must examine it, if we wish thoroughly to understand and promote gracefulness, it depends upon close co-ordination between the nervous system and the trunk and limbs of the body. Extreme deficiency in that co-ordination may be illustrated by citing the case of one who has St. Vitus's dance, and moderate deficiency by that of one who is muscularly well developed, but does everything awkwardly. Grace, on the contrary, represents the complete adaptation of movement to the mechanism of the body. It presents ocular evidence of the smallest expenditure of force

for a given effect. When its constituent qualities are analyzed, it is found to be manifesting itself by curvilinear movement within the bounds associated with mechanical effectiveness and the appearance of perfect ease. Hence the superiority of women over men in gracefulness.

Let not the reader, however, for a moment confound the concomitant of ease with the constituents of gracefulness. An athlete may raise from the ground, hold at arm's length, or otherwise handle with what may be called ease, a very heavy weight, but that does not make any of his movements necessarily easy in the sense of their being graceful. Even if he were able to perform all his movements with the curvilinear differences that would be inseparable from female deployment of the same muscles, he would not thereby become more graceful, because the resulting action would not be appropriate to the masculine form. Nothing is more open to observation than that to each sex difference of physical conformation assigns difference of movement; for we find that women, when they approach the masculine type of form, are exceedingly awkward and unattractive, and that men, when they approach the feminine type, become thereby positively emasculated in appearance, and repulsive. There are certain well-defined bounds within which gracefulness can be exhibited by individuals of the male sex, as in the Spanish and some other national dances, but no bounds can be assigned to individuals of the opposite sex within which action must be confined to insure gracefulness. The *première danseuse* is admirable, but the *premier danseur* is abominable. Beyond the simpler order of movements, the latter degenerates into an exhibition of pure athleticism, while, with the former, the most pronounced exhibition of athleticism is completely veiled by the quality of feminine grace.

The appearance of ease is, as has been indicated, the effect of curvilinear movements. First in the sequence of causes and

effects comes co-ordination of the nervous system with the body and limbs. Next in order of importance comes symmetrical development in accordance with sex. The product of these is the individual of either sex who represents a good organization for the ordinary purposes of life. Beyond that is the highest possible co-ordination of the nervous system with a form of the highest symmetry. These conjoined, with physical education, lead to the highest possible manifestation of the special physical aptitude and grace appropriate to each sex. Anatomical differences between the sexes causing the movements of women to be executed in lines more curved than they are when executed by men, it comes about that when, according to their type, women are beautiful in face and form, and nervously highly organized, and are at the same time physically and socially well trained, they present the highest possible example of development, for they, the fairest of creatures, are thus endowed, in grace, with nature's final embellishment.

It is easy to see why certain movements executed by individuals of one sex are not equally well performed by individuals of the opposite one. It would follow from what has been said, that those movements which are least curved would be best executed by men, and observation bears out the statement that they are. Men strike horizontally straight from the shoulder, throw with admirable precision, and kick and run with the utmost directness of movement. Women, on the contrary, that is, typically well-formed women, cannot execute any of these movements with either ease or grace. Woman's arm is articulated lower at the shoulder than is that of man, because it is placed with reference to the position of her more slanting shoulders, and the arm itself is not so straight as his, and she cannot in consequence throw a stone well, or, to save her life, hit a straight blow from the shoulder. She is, too, if well-formed, what would be called in a man slightly knock-kneed,

and in consequence she cannot, on the run, avoid a lateral movement representing a waste of energy for the purpose to be accomplished. The cancan, performed by young, slim girls, instead of being available as the basis of an argument against the view that women are unable to kick effectively, is confirmatory of it, for one of the prominent elements in the dance is the ridiculousness of the kicking. But if we, personally, could have any doubt of feminine kicking being ridiculous, through unadapted physical conformation, it would be removed by the revival in our mind of a scene which we once witnessed at a country-seat, where four young ladies from the city, visiting one afternoon, and finding a Rugby foot-ball on the lawn, were inspired to have a game, and were instigated thereto by the host and hostess and two or three guests who occupied the porch. The spot was so sequestered as to be entirely beyond the possibility of observation, and so, the newcomers taking sides of two against two, the game began. So painful an exhibition we have never before or since witnessed. The ball was mounted by one of the girls missing it on the run and kicking herself into the air, whence she descended collapsed, to be tumbled over by her partner in an indiscriminate heap. And so the game went on for twenty minutes, with the players half the time on the ground making revolving efforts to rise, while the people on the porch, from being suffocated with laughter, roared with most inelegant shouts, wept, and became weak and hysterical, while they besought the equally-exhausted lawn-party to desist. Painful! —there were moments when we were so sore and aching all over that we would have given anything to be miles away from the extraordinary fascination of that sport!

CHAPTER XI.

THE ART OF WALKING.

IN a very interesting work which appeared two or three years ago, entitled "Romantic Love and Personal Beauty," lately supplemented by the author, Mr. Henry T. Finck, in an article in which he descants admiringly on the beauty of Spanish women as enhanced by their singularly graceful carriage, he incidentally makes some erroneous statements in regard to the art of walking, all the more remarkable as coming from an observer and connoisseur in the charms which he depicts. Incidentally, however, to noticing this error, we feel bound in honor to say that, with the exception of only one other, which we shall have occasion to notice in the next chapter,—that as to his view of the future virtual extirpation of the blonde by the brunette type of beauty,—Mr. Finck's work is most instructive, and to be cordially recommended to every one desirous of closely studying beauty as influenced by romantic love. To the demonstration of this hitherto much-overlooked source of beauty, his work is especially devoted. The present state of physiological knowledge fully supports the conclusions which he reaches by ample discussion and illustration. If, as undoubtedly they do, drunkenness and other causes which have a deleterious influence upon the human organism, and, on the other hand, all that conduces to its health, impress themselves upon offspring, it is impossible that it should be otherwise than that the sexual congress which is necessary to the extension of life, by which, in effect, parents are perpetuated in their children, should not, when associated with romantic love, in creatures so highly endowed as are human beings with the faculty of ideation, produce the happiest effect upon health, vigor, and beauty of offspring.

The very pictures of Spanish women, by Fortuny and others, with which Mr. Finck's article, on the beauty of Spanish women, is illustrated, refute his statements on the art of walking, in his work on "Romantic Love and Personal Beauty." He there remarks that—

It is a mooted question whether the toes should be slightly turned outward, as dancing-masters insist, or placed in straight parallel lines, as some physiologists hold. For the reasons indicated in the last paragraph, physiologists are clearly right. With parallel, or almost parallel, great toes a graceful walk is more easily attained than by turning out the toes. Even in standing, Dr. Thomas S. Ellis argues, the parallel position is preferable. When a body [he says] stands on four points, I know of no reason why it should stand more firmly if those points be unequally disposed. The tendency to fall forward would seem to be even increased by widening the distance between the points in front, and it is in this direction that falls most commonly occur.

Gracefulness of walking is so essential to elegance of presence, and so dependent upon the proper position of the feet with reference to the body and the line of advance, that one cannot do better than take the preceding statement as text for the discussion of the subject, which cannot properly be omitted in a work like this, and which finds its most appropriate place at the point that we have reached.

First of all, before proceeding farther, certain ambiguities in the statement must be cleared up. It is to be observed that, after the author had spoken of the feet being placed in "straight parallel lines, as *some* physiologists hold," he subjoins that "*physiologists* are clearly right." Now, the most that can be claimed is that *some* physiologists advocate the practice described; but that of itself has no weight, for there is no question, great or small, upon which members of any profession are all agreed in opinion. Authority that compels acceptance of views can come only from overwhelming majority, individual distinction, or demonstration, and all these are wanting to the statement. It is our conviction that authority for the opposite opinion is represented by enormous preponderance in the num-

bers and prominence of its advocates over those who hold the opinion cited.

It is to be considered, with reference to the citation of dancing-masters as having exaggerated notions of how the feet should be placed, that they represent only a certain kind of drill, and that all drill, as has been elsewhere intimated, is excessive in formal teaching, in order to allow ample margin for lapse in actual practice. The soldier is taught, in the manual of arms, in marching, and all that appertains to drill, what is to serve him in stead in his military life, but what does not so formally there appear. It is notorious that, in the *assaults d'armes*, the small-sword practice with foils, when they take place as competitive contests, the academical style, as it is termed, largely disappears in the heat and exigencies of the contests. So we may say of boxing and of any other athletic exercises, that there are formal positions, always in excess of those which are to be observed in actual use, and still more in emergency. In close contest, nature declines to be strictly academical, and yet the practice which is born of the school and the academy better fits the possessor than otherwise to use the powers with which he has been gifted by nature.

We reach the consideration as to what degree of turning out of the toes is permitted by the expression quoted: "With parallel, or *almost parallel*, great toes a graceful walk is more easily attained than by turning out the toes." The angle at which, in our estimation, the toes should be turned out is that at which the ball of the great toe, as well as the great toe itself, can best act, not only as the fulcrum around which the body is moving, but as giving the most considerable repeated force in propulsion. This angle is not to be arbitrarily determined, but should depend upon and be fixed by what constitutes the most effective movement of the body. The rigid march of Frederic the Great's soldiers was the model first adopted by our army.

The whole world imitated it on parade. It remained for the French (among the most practical people on earth) to discover that even the arms have, through their momentum, a function in marching. Hence, was to be seen among the French, forty years ago, the first true military marching, where the body sways with an easy carriage.

Now, neither in marching nor in walking—for they are essentially the same thing, marching being only formal walking (and hence those persons walk best who have been taught to march)—can the body move best with parallel feet. The most perfect freedom possible of movement of the whole body in the walk should, as we have indicated, determine the angle at which the feet should be turned out, and this will slightly differ in different persons, with breadth of shoulder and length of leg. So adjusted as to angle, the movement of advancing is accompanied by shoulders alternately thrown back, and corresponding expansion of the chest. Observation of any one walking with turned-in or parallel toes will prove that the shoulders alternately describe smaller arcs, and that the whole effect is contracted and ungainly.

Dr. Ellis's advocacy of parallel feet, quoted with approval by Mr. Finck, is entirely untenable from the point of view of geometry and physics. He says :—

When a body stands on four points, I know of no reason why it should stand more firmly if those points be unequally disposed. The tendency to fall forward would seem to be even increased by widening the distance between the points in front, and it is in this direction that falls most commonly occur.

If Dr. Ellis would take a jointed doll, place its feet parallel, and stand it up on a table, he would find that it is in a position of most unstable equilibrium. If he would then, without removing it, turn the doll's toes slightly outward, he would find it firmly placed. As it is not alone the area of the soles of both feet upon which the human figure stands as its base, but the

area bounded by the outer edges of the feet and imaginary lines drawn respectively from toe to toe and heel to heel, the base upon which the body stands when the feet are parallel is represented by a small parallelogram. After the feet have been so placed, let the toes be turned slightly outward. One side of the area remains the same (the line from heel to heel); one side becomes considerably longer (the line from toe to toe); and the two sides represented by the outside edges of the feet remain, of course, of the same length. The area representing the base upon which the body stands is slightly contracted from front to rear, but that is more than counterbalanced by the increase of the area from side to side.

Dr. Ellis's opinion as to the direction in liability of falling being based upon false premises is, of course, equally in error with them. We fall forward more frequently than otherwise, not from relative lack of base to prevent falling in that direction, but because we are physically better fitted to fall forward than to fall in any other direction, because we *seek* to so fall, in order to avoid the likelihood of greater injury from falling in other directions. But let us go to the root of the matter as the shortest way of coming to the end. The progression called walking is effected automatically, after the first step, by the body being thrown slightly forward beyond its centre of gravity, the foot behind advancing to support it in its new position, whence the operation is resumed by the same action of the body, while the other foot advances to support it. The habit of life in walking is automatic. Except as to learning originally how to walk, and later in life, as to initiating and arresting the movement, it is entirely stimulated and maintained, not by the brain, but by the reflex action of the educated spinal cord. This perfected habit makes us instinctively endeavor when falling to place ourselves as nearly as possible in the position in which immunity from harm most lies. That position is forward, because habit has

enabled us to calculate best for that direction the effect of loss of centre of gravity, and because for that direction the hands are best placed to enable us to save ourselves. The preferable positions for falling are, first, forward, and, second, backward; because in both the hands are most advantageously placed for protecting us from injury. If Dr. Ellis were right, the best position in which to fall would be sidewise, which is the most helpless of all directions in which to fall, because no instinctive calculation can be made for the effects of the loss of the centre of gravity; we are powerless to modify the direction of our fall, and only one hand is so situated as to be able to diminish the shock.

Let us now consider the æsthetic side of the question. Persons who turn their toes in, or turn one in and hold the other straight to the front, are notably ungraceful in bearing. The parrot- and parallel- toes of the American Indian represent a most ungainly walk, acquired through thousands of generations in the exigency of following trails through the wilderness. Similar walking among civilized people represents the child status of progressive movement, unmodified by family or other training. It is as much a reflection upon original birth and breeding as is left-handedness. The dancing-master's *dictum* represents nothing but excess in what all polished nations have adopted as the best practice in standing and walking, while the American Indian and other savages have been, to a man or woman, constrained by the necessities of their existence to do otherwise. Go where one will, the world over, and it will be found that the higher classes have reached this conclusion, and among all exemplars of the truth and beauty of the practice there is none higher to be found than in the gait and splendid port of Spanish women.

Subject to due modification, with reference to the height, length of leg, and breadth of person, the toe of each foot should be turned out about three inches. Breadth of person enters

into consideration, as well as height, because a short, stout person, with a given amount of movement at the feet pointed outward, sways at the shoulders more than a taller person does with the toes turned out to the same degree; not actually more, but disproportionately with reference to height and breadth, and therefore to effect produced. Hence, the marked rolling motion of the shoulders, appropriate to the gait of a sailor, but not compatible with a graceful walk, is to be avoided by modifying the position of the feet with reference to individual physical conformation.

The length of the step should be proportioned to the length of the leg. If the foot is thrown too far forward for the natural stride, or the ankle-joint is not allowed play, when the foot reaches the ground it strikes stiffly, with a jar, on the end of the heel. The length of the step and the flexure of the ankle should be such as to allow the parts of the sole to touch the ground almost simultaneously.

The toes must never be turned out so much, nor the foot be so placed, as to allow the foot to rest on the outer edge. Neither must it be allowed to rest on the inner edge, but in all positions be firmly planted on the ground. The first position gives a simian, or ape-like, effect to the foot, and degrades the whole movement of the body. The second has the effect of what is known in surgery as splay-foot, in which the inner part of the ankle actually touches the ground, and has a most ungainly appearance. However, short of deformity, this position is, with the toes turned out, difficult to assume.

There is no more awkward appearance in walking than that produced by the toes excessively turned out, so that the side of the leg is seen in a person advancing presented to the front. Under these circumstances the movement of both leg and body is most unsightly, not to be exceeded by, if less vulgar than, the effect produced by turning the toes in, the essential vulgarity

of which is recognized by its being the invariable attitude of the circus clown.

In brief, turn the toes out slightly, graduate the step so that the parts of the sole of the foot shall reach the ground as nearly as possible simultaneously and squarely planted. Make the whole movement elastic ; avoiding, on the one hand, the appearance of stiffness, and, on the other, that of springiness at the knees,—the first a sign of muscular weakness, and the other an old buck's ill-advised protest against encroaching senility. When going at a moderate pace, let the arms, when unincumbered, swing gently in unison with the movement of the body, and the side, not the back of the hand, be to the front. When going at high speed, let the arms move vigorously at the sides in aid of the movement. In all movement of the arms, when walking, be careful not to let the forearm pass across the body as seen from the front. This action characterizes the rapid walk of the bumpkin, the hoodlum, and of all untrained persons. Examine the soles of your shoes occasionally for evidence of what you have been doing as to proper planting of the foot on the ground. If the heel is jammed, and the outer edge of the sole unduly worn, you turn your toes out too much, that is certain ; and either your step is too long for the length of the leg, or your ankle-joint does not flex enough as the foot is about to be placed on the ground. Perhaps both causes are operative at the same time in effecting the wear and tear of the heel, and hence, full evidence being procurable by you, it is in your power gradually to modify and correct the error.

One thing is primarily necessary to grace, as well as to beauty,—form. But, even given form, beauty of the highest order cannot exist without grace. Grace, in turn, cannot exist without freedom of action in every part of the body. Nothing so mars it as constriction of the trunk and feet. Why do the movements of little girls dancing give so much pleasure to the

spectator, but that they exhibit the natural freedom of movement belonging to youth? There may not be present any particular physical beauty, and yet this endowment alone is ravishing. Observe only a few years afterward the movements of the same girls when similarly engaged, and see how the grace, which should by education have increased, has largely departed or entirely vanished. Whence does this arise but from the habit of constraining dress having reduced vigor and suppleness of body? The trunk, arms, and legs have lost the habit of subtle turns of beauty, which glide into each other with rhythmical flow. Stiffness pervades the whole carriage, whether in sitting, walking, dancing, or running; which last has come to be well-nigh impossible. Thousands of women who have within them infinite capacity for grace, always move constrainedly through life, in their stifling and circulation-impeding corsets, their excruciating shoes, and, when fashion so wills, in sleeves so tight as to restrict them to the gestures of a kangaroo. Look on at ball-play, or at any pastime where young men are congregated, and see their athletic pose and movement and unconfined grace, and what a contrast do we find between them and the majority of young women in physical development and the highest being! So it often comes to pass that many individuals of the fair sex, which nature has most distinctively endowed with capacity for grace, deliberately abdicate with their rights their fullest empire over men.

If we were instructing girls and young women in calisthenics, we would surely take advantage of the effects produced in the bearing of the whole person by the carrying of objects like water-jars upon the head. No one who has ever been in climes where women thus habitually bear such burdens can have any doubt as to the excellence of the training for securing graceful attitude. The arms, too, as they are sometimes raised alternately at intervals, to re-adjust the burden or to insure its

safety, touching with the finger-tips the poised jar or other object, come in for a share of training in gracefulness. The first meeting of Jacob with the beautiful Rebecca at the well was singularly adapted, from the setting in which she appeared, to bring about the love at first sight that ensued.

Montaigne remarks in one of his essays, that—

Those mean fellows that teach to dance, not being able to represent the presence and decency of our nobleness, are fain to supply it with dangerous leaps and other strange motions and fantastic tricks. And the ladies are less put to it in dances where there are several *coupées*, changes, and quick motions of the body, than in some other of a more solemn kind, where they are only to move a natural pace, and to represent their ordinary grace and presence.

This is but equivalent to saying that twinkling feet, leaps, and pigeon-wings may but serve to conceal total lack of grace. The movements which approach most closely to the habitual ones of life are the crucial tests of inherent grace, the rarest of all graces being the pose and movement of the head on well-turned shoulders. The physical elements, the machinery, are often present, but not the movement which should be associated with them. To produce this special gracefulness, nothing is more efficient than the exercise of carrying on the head a light burden, high enough to require balancing. Women, it is true, are in some countries obliged to carry burdens so great as to degrade, instead of improving, form and movement; but we have already pointed out that any kind of labor pushed to the point of toil is destructive, instead of promotive, of physical well-being. It must be remembered, therefore, when we speak of the beneficial effect on gracefulness of carrying burdens upon the head, that we exclude exercise involving toil, and even what might be called labor, and refer exclusively to exercise which, as determined by the muscular force necessary to accomplish it, and by the time required for its performance, any one would consider light. Calisthenic exercises look to the improvement of the physical condition, as representing vitality, and to rounding

muscles, as representing beauty of form and one of the first conditions of gracefulness. The kind of exercise just recommended as especially conducive to gracefulness, whether growing out of the habits of the country or undertaken for the sake of its special effects, makes excellent training for co-ordinating different parts of the body, from the crown of the head to the sole of the foot. The centre of gravity of the burden requiring to be maintained, the most perfect accord in the movement of the bearer is necessitated. The head erect, neck and spine acting together, all must harmonize exactly with the pace. One of the most charming sights that ever gratified our artistic sense in a foreign land was the lithe, vigorous figure of a young girl clad in a single garment, with a basket of limes poised gracefully upon her head. After a little practice, the effort necessary at first to balancing an object of some height, such as a water-jar, entirely ceases, and the sense of ease with which it can be done is pleasurable. The burden seems to have become part of the bearer, and when relieved of it the educated spinal column ceases not to assert its gain, especially in the gracefulness of the pose of the head.

Only in April last, Dr. Ellis, whose views on standing and walking Mr. Finck so approvingly quotes, appeared in an elaborate article, in Wood's "Medical and Surgical Monographs" (William Wood & Co., New York), entitled "The Foot." The writer is Dr. Thomas S. Ellis, Consulting Surgeon to the General Infirmary at Gloucester, England. As this is Dr. Ellis's last word on the structure of the foot, standing, and walking; as the exercise of walking is the most general of any among mankind; and as upon the proper execution of it much of the development and nearly all grace of person depend, the subject is one of such great importance that we here pursue it in the most effective of all methods by challenging the accuracy of Dr. Ellis's conclusion. That a monograph of one hundred and one

well-written, well-printed, and well-illustrated pages should have been devoted by a man perfectly conversant with the anatomy of the foot, and having, through a personal accident to that member, had his attention directed to it in a way seemingly sure to be productive of the most valuable results, but should have reached what may, with literal precision, be termed a lame and impotent conclusion, would be marvelous to any one who does not know what constant experience teaches, that the imagination, like the vaulting ambition of which Shakespeare speaks, frequently o'erleaps itself and falls on t'other side. Facts Dr. Ellis gives us in plenty,—facts excellently well stated. It is not with reference to his allegations as to these that we quarrel, but with his conclusion.

Dr. Ellis sets out by saying that each foot is the counterpart and complement of the other. We reply that the human body having only two feet, if one is the counterpart of the other, it is necessarily its complement. But let us consider the special feature which, in Dr. Ellis's eyes, makes one foot peculiarly complementary to the other. The foot is, he says, on its inner, under aspect, a semi-dome, from which circumstance arises the fact that if one foot forms a semi-dome, of course the other also forming a semi-dome, the two together form a dome.

These are facts, but the conception was a most unhappy one for Dr. Ellis's conclusions, for, having once adopted it, the idea of the strength inherent in the dome subordinates all other facts thenceforth, and we have the position of both standing and walking regarded by him as referable to this dome-like form of the two feet in conjunction. Now, one should think that, of all things palpable, the fallacy in this conclusion would be self-evident. It would really seem, when one remembers how subsidiarily the feet act with reference to each other, as compared with their action with reference to the exigencies of the movement of the trunk of the body, all idea of joint dome-like

construction relating to their acting in conjunction for the support of the trunk would be swept away. What becomes of the dome when a man is running, when he is hopping, when he is dancing, when he is practicing at savate—aye, when he is moderately walking, or even standing in an ordinary position? The feet are acting in concert, but the concert with which they act never fulfills the demands of the dome structure, for one semi-dome is in one place while the other semi-dome is in another. Hence, Dr. Ellis's conclusion, that one walks to the best advantage with parallel feet is not deducible from the proposition stated, for, even in walking, the two semi-domes are alternately passing each other, not combining for dome strength.

Dr. Ellis indicates that, just as one walking with parallel feet thus best propels the body with the rise and backward thrust of the great toe, so also the ordinary dancer rises and falls best on the great toes of parallel feet. We think that propulsion of the body can be best effected by the line formed by the great toe and the ball of the foot when placed in the position secured by turning the feet slightly out, because then one combines the spring of the great toe with that line in a more effective position for thrusting. But even were this not so, equally important with the means of propulsion of the body, are those of maintenance to the best advantage of its equilibrium. A crucial test of what should be the position of the feet with reference to equilibrium, and consequently with reference to the best control and action of the body, ought to be, and is, the effect of that position in which the feet touch the ground with the minimum of surface capable of supporting the body, as we observe practiced in some of the movements of the ballet-dancer. Now, such dancers do not, in tip-toe passages of the ballet, stand or move with parallel feet, as any one may see from the parquet or boxes of a theatre, for the curve of the sole of the foot is visible from the front. If, as any one with a quick eye can detect, the

dancer, whether standing, walking, or dancing on the points of the toes, allows the heels to subside until they touch the floor, the toes are proved to have been well turned out. In fact, when the weight of the dancer is resting on the points of the toes, it is only upon condition that the foot, and consequently the inside of the leg, shall be slightly turned out, that graceful movements, or indeed any but those most insecure and awkward, can take place without losing the balance. Hence, if this be so under the great disadvantage of the tip-toe position of the dancer, it must be also true for the position where the feet are placed as in walking, that by turning the toes slightly out equilibrium and graceful movement are best secured.

. Dr. Ellis asks ironically whether it is really the fact, as has been alleged, that the body stands on a broader base with the toes turned out than it does when the feet are parallel. It seems to him, he says, that with parallel feet the body would, as the poet says, stand on a broader base,

Like a tower that stood four-square to every wind that blew.

Dr. Ellis does not state the case fairly, for when he makes the suppositious tower of the human body stand "four-square" he assumes that the heels are apart, but when he makes this same tower stand in angular fashion he assumes that the heels are touching. Now, neither in walking nor in standing, except in "attention" at drill, in bowing, and in "positions" in dancing, are the heels placed together. To make the comparison fairly, therefore, it is necessary to suppose that in both cases the heels are at the usual, or at least the same, distance apart, and that being done, the base of the body, as we have previously shown, is larger in area with the toes slightly turned out than it is with the feet parallel, and therefore the equilibrium of the body more stable.

Dr. Ellis takes direct issue with the military for their mode of marching. It follows from what we have said that we think

their views correct. Now that everywhere in the world the absurd Prussian drill originating a century and more ago has been gradually discarded, of carrying a free arm as if it were a lifeless appendage of the body, there is no ground for criticism of military marching. On parade there will always be some stiffness, as the men are *en grande tenue*, but the present instruction is in the right direction, and, when it comes to real marching in the field, nature asserts itself and supplements the drill.

We cannot but regret that Dr. Ellis has spent so much erudition, time, and labor in reaching a conclusion which observation and experience do not justify. That his work is well done from his point of view is the only reason why we have noticed it at length, fearing that it might to the inexperienced convey false impressions. The highest compliment that we can pay Dr. Ellis, short of agreeing with him, is in thus painstakingly altogether dissenting from him, for the meed of excellence of demonstration, whether right or wrong, is to invite opposition, while mediocrity and weakness inevitably suffer neglect.



CHAPTER XII.

THE EVOLUTION OF THE AMERICAN GIRL.

ALTHOUGH, as Judge Haliburton remarks in "Sam Slick," women always look out for the becoming, it should be admitted that they do not always find it. They are, it is true, through organization and education, more generally desirous to please than are men, and therefore they are on that account more anxious to adopt the becoming in dress, but that they have any higher sense of and liking for the becoming, as some women think, is a claim that can be disproved by numerous facts. The autocrat of the world in feminine attire has been for decades a man, represented the world over by minor masculine potentates within their humbler domains, and the universal cry of well-dressed women is that they find among female mantua-makers so little taste and skill.

As women dress, in the adornment sense, either directly to please men, or, indirectly, in rivalry of each other with reference to pleasing men, as one would be blind not to see at a watering-place, who observes the change that takes place in the dress of women as soon as the men begin to appear in numbers, it is conclusive that men are pleased with form and color as having functions in the natural attractions of the sexes, and that women well know and utilize the fact. It is therefore certain, also, that women of sense recognize men as having discernment in form and color equal to that possessed by themselves. The statement about women being gifted with finer taste than men is belied by the history of every decorative as well as higher art. Physiologically, the sexes ought to be, and experience shows that they are, adapted to each other in mind and taste,—in every physical and mental attribute. The society condition and aspect of men and women in all civilized countries are the joint product

of individuals of both sexes, more attention to dress appearing in women than in men solely because such is the wish of the men as well as of the women themselves. The day was when men were quite as fastidious, fanciful, and fantastic as women in their dress. Now they otherwise satisfy their pride and vanity by making birds of paradise of their mates, and taking to themselves some of the credit for their choice and taste. *The London Daily News* said, not long ago, when discussing late attempts in England to change the costume of gentlemen for dress occasions, "Black makes a suitable background for anything. It is characteristic of the abdicated lordship of man that he now dresses only to show off his wife's clothes."

The standard of the day in taste in dress, no matter what the era of the world, represents little beyond love of variety. Being, up to a certain point, imperative, it introduces, on account of the existence of ill-adapted physical traits, an immense amount of incongruity with every change. But, accepting it for what it is, with its greater than of old but still small latitude, it is only just to say that American women are given by the fashionable centre of the world the palm among foreigners for general good dressing. It must be remembered, however, that for every thousand who go abroad a million stay at home; that of the thousand less than a hundred may enter circles of society competent to judge of what they speak; and that a still further allowance must be made for the influence of the late undisguised foreign opinion of American feminine charms in money. But, with all these allowances, taking in sum the expression of opinion abroad, the expression of opinion by foreigners traveling in this country, and the opinion of our own countrymen, who travel in Europe as well as over the length and breadth of our own land, the female population in this country is better dressed than any other in the world, and the dressing of its female fashionable society compares with any to be seen in Europe.

One thing, even if there were no other, would, after making all due allowance for the imperiousness of fashion, confound with men the claim of unthinking women to greater taste for their sex as compared with the taste of men,—that multitudes of women do not take advantage of even the little latitude allowed by the mandates of fashion, in adaptation to the demands of individual requirement of what must in the main be accepted. A girl is tall and narrow, let us say, as well as square in the shoulders; then, if the fashion be high-shouldered, many such will wear excessively epaulettéd puffs on seal-skin and other coats, and what is wrong in nature is thus made doubly wrong by art. If they are long-waisted,—one of the greatest blemishes in female form,—then thousands of girls exaggerate the exaggeration of the fashion, until, from armpit to hip, the body looks like a post. Given a dumpy or a fat woman, whether tall or short, and she will be often found caparisoned in seal-skin or in velvet of the deepest pile. Let some one be framed by nature to move with elephantine mien and tread, and she will often wear, drawn in at the waist, with consummate assurance of superlative grace, an India shawl or gauzy fabric at eventide that would make bewitching the figure of a willowy girl. Why do they not see, if feminine taste is universal, that back of design, execution, and richest fabric must lie a profound sense of congruity, if one would secure the effect of dress? Suitableness to station, place, occasion, age, weather, and other conditions cannot be ignored.

As Paris accords to American women of society a rank equal to that of the native Parisian in the art of dressing, and the justness of the view is confirmed by other evidence, we are entitled to plume ourselves on account of this exalted praise, from which Englishwomen are rigidly excluded as representing the lowest grade of refined inelegance. But the question here arises,—and it is the important one for which we set out to speak upon eventually,—whether there are not, for beauty, better things than its

accessories. In the fundamental attributes of attractiveness American women far excel the French. Where American women excel the French is in beauty and greater breadth of mind, and where Frenchwomen excel the American is in elegance and grace. The American has the better part, for elegance and grace will grow in her, but the Frenchwoman is distanced beyond recovery in the field of beauty. Beauty in the Frenchwoman of the century is as rare as it is common in the American during the last twenty years. Modern observers, with one accord, note the deficiency of both male and female beauty in France. The men are generally short and hirsute, and the women rarely handsome, their charm consisting in their elegance and vivacity. Mark Twain long ago put on record his opinion of the beauty of the renowned grisette. But, perhaps, of all plainness in France, that of the middle-aged Parisian bourgeoisie is the most marked. Brought up in a social atmosphere where the idea of sexuality lies less dormant than anywhere else in the world, finding it next to impossible *rénoncer à plaire*, as she calls it, she frequently makes herself to unaccustomed eyes hideous in her antique youthfulness. To grow old gracefully is not given to any one who tries to seem, not younger than one is, but younger than one feels in body and mind, for age is not strictly conformable to years. The verses in which Béranger describes the frisky grandmother, enlivened with a glass of wine, and become confidential to her minx of a granddaughter on the subject of her youthful love-passages, is not so far-fetched as it might appear to the inexperienced. At least, an old Frenchman with whom we were acquainted must have thought the picture life-like, as he once gleefully recited to us a verse of the song, ending with its refrain :—

Combien je regrette
 Mon bras si dodu,
 Ma jambe bien faite,
 Et le temps perdu.

It is, then, to be concluded, if we have so far written to any

purpose, that in the person of the wearer there is something more admirable than in mere clothes themselves. The kernel ought to be more valuable and attractive than the husk or shell. Sensible women seek to make more than clothes-racks of themselves; but, alas! how many there are who care not what lies beneath, and are oblivious, if they ever knew, that the Queen of Sheba's wealth of attire would not compensate for a carriage which makes its richness grotesque! The most seductive of dry-goods, even though they be supported by the shaping of the finest cotton-wool, do not represent female grace and beauty. The wise matrons and virgins will not be provoked if we speak feelingly in the interest of the whole of the adorable sex. Especially would it be ungrateful to hold us responsible for plain speaking, when our whole intent and aim are to indicate ways and means by which the results generally desired, and never successfully sought otherwise, are the likeliest of attainment.

Before the glance of an anatomist, or even of a connoisseur in female beauty, all art of dressing not based on natural gifts, is the flimsiest artifice, the most transparent disguise. The cotton-fields of the world have not within their bursting pods the witching grace and beauty that lie in the individual moods of nature in the female form. Suppose, for a moment, that an artist were to fill out every lacking roundness, and the best Parisian corset-shapes were to compel too great exuberance to yield, still standing in the way would remain the stalwart fact that artificial figure and constraint to the explosive point cannot imitate the subtle lines of beauty, or, more than all, impart to movement the slightest grace. No stern mentors we, or we should be moralizing on the dangers of female beauty, instead of seeking to improve it. We do not forget the sound observations of the Herr Professor Teufelsdröckh, when he says, "Thus in this one pregnant subject of *clothes*, rightly understood, is included all that men have thought, dreamed, done,

and been ; the whole external universe and what it holds is but clothing ; and the essence of all science lies in the *philosophy of clothes*." And again, "Is not the fair fabric of society itself, with its royal mantles and pontifical stoles, whereby, from nakedness and dismemberment, we are organized into politics, into nations, and a whole co-operating mankind, the creation, as has often been irrefragably evinced, of the tailor alone?" On the contrary, well do we know besides, with that cynical professor, that clothes are the invention of the arch-enemy of mankind, or, at least, that his interference in earthly affairs led to their introduction, and moreover, that so originating with the father of lies, they cannot be expected to be perfectly truthful. But, therefore, our aim should be all the more, while accepting the inevitable, to demonstrate that woman in this present era is more worthy than her clothes, and by improving the truthfulness of her form and the untruthfulness of them, to shame the very devil.

Retrospectively going back just fifty years, and confining our attention to this country, we shall find that evolution in politics, society, and clothes have been coincident in time. Politics having no relation to clothes (in the æsthetic sense, being more often found in company with seediness, the last two conditions, which are intimately associated, alone invite our attention. Just fifty years ago California was not thought of, Chicago was only three years old, Dickens was describing New York as a long, flat, straggling city, while Philadelphia had been built only about half-way across from the Delaware to the Schnylkill. Scattering F.F.V.'s represented, in the North as well as in the South, the cream of society. Only the three hundred (leaving out the Thespians) of Thermopylæ were known to fame, the six hundred had not charged at Balaclava, and the four hundred had not emerged from the hoary ancestry of New York. The *nouveaux riches* lived and died unknown.

Society in all ranks plodded on from year to year with scarcely any but the local excitements of a schützen park or of a volunteer-fireman's fight; the universal plethora finding at last some relief in the blood-letting of the aggressive Mexican war. That over, the humdrum of national and social existence returned, tempered by the ever-present social sentiment of all communities as to how we apples swim.

Then came the first event since the Revolution which profoundly stirred the pulses of the people. Amidst it, all social lines were swept away, and out of a heterogeneous people living under one government came to the great majority a deep sense of nationality. Fused and welded in the fierce heat of the war, the diverse elements, and even the side which finally broke away, shattered under the momentum of the advancing hosts, learned to recognize and admit that, after all, blood is thicker than water, and that it now, more firmly than ever before, cements the bond of union. Destruction untold there was, of course, during this fearful time, blight of all sorts, but from them has emerged a nation feeling in almost every individual man that its destiny lies within itself to be the most favored and powerful upon earth.

What social phases had been exhibited during that quarter of a century! The population at the beginning (1840), of not quite twenty millions, was, by the end of the war, about twice that amount, dispersed over an immense territory, its greatest density still upon the Atlantic sea-board. The primitive times from the Revolution, lingering in 1840, when many children still attended the public schools of the city bare-foot, had been gradually disappearing, by the beginning of the war had almost gone, and by the end of it had finally departed. Ideas of comfort, luxury, manners, dress, had become, however correct or otherwise, common property. Dwellings there had been plenty in 1840, architecture scarcely any. The wood-fire, so

delightful now to the fancy, was in 1840 still lingering in old-fashioned houses, having roasted the preceding generations in the face while it left their backs to freeze. The beginning of the century had seen people not even properly shod for inclemencies of weather. Our grandfathers and great-grandfathers got along pretty well, for, about the beginning of the century, except for dress occasions, they had given up small-clothes and adopted the much-ridiculed pantaloons. When they went abroad in rain, hail, or snow, they put on stout boots; but their helpmates, as late as 1840, were still wearing paper-soled slippers over their white-stockinged feet, crossed by laces which passed behind the ankle and were tied in front. If they must needs brave the weather, they had no other resource than to drag on primitive round-toed rubber shoes, which, if cold, required thawing out before they could be got on even at the expense of exertions which would have cost a saint his canonization. Underclothing was not so suitable or profuse in quantity as it is now, and we much fear that the heirlooms of ivory hands on ebony stiffs betoken that the skin at the beginning of the century was not in so hygienic a condition as it is at present. Despite the fact of the existence of the sturdy souls that history depicts as the almost invariable possession of the women of the Revolutionary period, and the sturdy bodies which portraits often represent them to have had, it is the fact, that after the beginning of the century, up to about 1840, American women of the better classes did not give evidence of anything like exuberant health. First of all, it is not to be expected that any people can in a few generations become reconciled to the entirely new conditions which cease to manifest themselves in the system by what we call acclimatization. They were in the cities, as countrywomen generally are now, too much housed, took too little exercise, had too little amusement, and were not healthfully clothed. The year 1840 saw the remnants of the decaying

practice of excruciatingly tight-lacing, of which a concomitant was an occasional fainting fit in company, associated with much sympathy among women for such sweet sensibility, although some of the ungodly did titter as they snipped the laces of the guiltily refractory stays. Albums were indispensable adjuncts as safety-valves of sentiment among girls, where platonic friendship luxuriantly flourished. The tendency of the times was humdrum, narrow, and lackadaisical, toward nervous constitution, and to types physically far inferior to those which are familiar to us now.

A new era set in about 1850, of which the dawn was scarcely perceptible ten years before, and steadily advanced in the physical and mental culture of women, in which the progress since has been truly astonishing. Much as remains to be done, vicious as are the relics of the former unhygienic life, in need of air, exercise, and healthful dress, women stand, as it were, on a mountain-top of freedom compared with their condition only fifty years ago. Those most favored of fortune, who are at the same time endowed with good sense, leave in their behalf scarcely anything to be desired. Most seem to be in some degree advancing. If we see many stragglers, it must be recognized that such must ever be present in the march of progress. They serve at least to make conspicuous the merit of those who lead the van.

The chief rule for the promotion of beauty are the seeking of fresh air, cleanliness of person, moderate exercise, nutritious, palatable, and varied food, unfettered body and limbs, regular work, with occasional amusement, and regularity of habits in walking and sleeping. Of all else, subservient to these, we shall, as in duty bound, speak when we come to details, in their proper place. We repeat that the present generation is far superior in health and beauty to those generations which have preceded it. The same improved conditions which have led to this consummation are still operative to raise future generations to a still

higher plane of being. The Countess of Jersey said lately, in an article in *The Nineteenth Century*, repudiating the idea that in England village-girls are not so robust as they were :—

Granting, however, as beside the present question, that village-girls are not so sturdy as they used to be, is it possible for any one with the most elementary powers and opportunities for observation to deny that the majority of girls "in society" are not only as strong as their predecessors of, say, thirty years ago, but that they are finer and taller than these were, and possess a greater air of health and vitality? The young lady, with fur around her boots, and her charming companions stand shivering on the brink of the pond, and never think of assuming the skates of which Mr. Winkle is so sternly deprived. To have possessed any boots at all must have been a considerable advance on the practice of earlier days; as both the text and illustrations of old novels represent the heroines as walking about in the country in thin shoes. Miss Edgeworth's Angelina, in *L'Amie Inconnue*, wanders on the Welsh mountains in slippers "of the thinnest kid-leather," and we are not surprised to learn that, when she lost her way, one fell off and the other was cut through by the stones.

If these things are true of the England of to-day, how much more wide-spread the favorable change of which the Countess speaks is in this country, where prosperity is far more widely diffused than in England. If, by taking thought, it is not possible within a life-time to increase one's stature by a cubit, it is at least, as experience is proving, possible and certain, by the observance of hygienic laws to strengthen and beautify the person, and to leave the precious gift to posterity.

The concomitant social aspects of the war-times were not less striking in their way than were the political convulsion, upheaval, and recasting of outgrown conditions. Social barriers, as was noted, were completely broken down; rich men, as such, first appeared prominently upon the scene of affairs; society re-organized upon a more liberal, more luxurious, and less virtuous basis. The *demi-mondaine*, far more influential than the Greek *hetaira* had ever been, imposed her laws of dress across the ocean. Some American women could even copy her lines of languor that mean debauchery, while all, more or less knowingly or unknowingly, were chained, under penalty of ridicule,

to *demi-mondaine* fashion's chariot-wheels. So it has remained to some degree even to the present day, the victories of the Germans working only partial emancipation. But the day is not far distant, as it seems to us, when the American woman, then the most educated, beautiful, and graceful of her sex upon earth, will no longer be in leading-strings to Paris or any other place, but, by the right of her superiority in mind and body, will, if there be any law to be imposed, lay it down for the rest of the world.

French dressing is the most highly artificial of any that has ever been devised. It recognizes no national costume, no ethnic growth of garb. It would, if it were able, take from the lovely Spanish maid her enchanting mantilla, and in place of it bestow upon her a Parisian hat. All times and peoples seen through it become blended in what Mr. Mantalini would call one demnition body, in which we at the present period see our Biddy wandering in bewildering richness of attire to the portals where she expects to save her soul. Sooth to say, no better is to be expected of the utter want of taste and originality among thousands of our countrywomen. For who, after all, must be excluded from the title of our countrywomen? All must be classed as such who have arrived as immigrants by ship-loads, as well as those who have, generation after generation, lived among refinements not to be exceeded by those of Europe. Can the woman who steps out of sabots or brogans on our shores, who had never at one time more than a single linsey-woolsey gown, who had never enjoyed variety of food, who had all her life been stinted in mind and body, be expected to see that silks and velvets and feathers, pitchfork-piled, and meat three times a day, do not constitute the sum of human bliss? How few there are of such who sometimes throng the streets of our large cities, who are as modest as Teresa Panza, and could possibly suspect the truth, as she did, when she thought that people might say

of her as countess, "See how proud the slattern goes; yesterday she was spinning of flax, and went to church with her petticoat over her head, and now to-day she goes in a cloak with brooches, puffed up so big that she cannot see us."

There are in the female form, as well as in the male, certain main proportions from which there can be no great divergence without entailing blemish. It is in consequence of this fact that unfemininely-formed women, but never femininely-formed ones, look well as pages upon the stage. These main proportions are the length from the top of the head to the top of the shoulder, from the top of the shoulder to the waist, from the waist to the hip-joint (the hip-joint, not the hip-bone), and the length from the hip-joint to the sole of the foot. It ought to be obvious, however, that the length from the top of the head to the top of the shoulder may, with reference to the other dimensions, be proportionally correct, and yet that the shoulder itself may be unfemininely square. Besides that, the curve from the jaw-bone to the extreme end of the shoulder, which is one of the most lovely of the typical curves in woman, may not be correct. Therefore it is that these and other proportions are not to be assumed as correct because those which we have noted as the main proportions chance to be. The main proportions may be correct and the details wrong. All that is intended, by speaking of the main proportions, is to indicate that these are indispensable as the basis of fine form, and that without them no correctness of form in single members can compensate for the defect.

In all the higher, as compared with the lower, races of mankind the length of the leg is greater and that of the arm less. This was so well known to the Greeks that their statues of the gods and demi-gods (and it must be remembered that those statues were always intended to represent ideal human form) are given great length of lower limb, so as to suggest greater grace or dignity of carriage. There is among women, as compared

with men of the same race, no essential difference in the relative length of the upper and lower limbs; but, inasmuch as the thigh of woman, unlike that of man, gradually expands from the knee upward, without appreciable break in the curve, until it flows into the rounding hip, reversing the curve only at the waist, the effect of relatively greater length of the lower limbs is produced, and is one of the characteristic beauties of the sex. It is, perhaps, the effect produced by this cause which Tennyson had in mind when he wrote, "A daughter of the gods, divinely tall, and most divinely fair." The effect of height in women beyond the actual stature is, of course, produced by the relative, not the absolute, length of lower limbs.

All artists and competent critics, the Song of Solomon, and amorous verses of all ages are in accord as to the special feminine beauty of the bosom, women themselves evidencing, through their universal habit of dressing, appreciation of the fact, sometimes within and sometimes beyond the bounds of modesty. It would therefore seem, at the first glance, as if every individual woman, of all races and countries, would know what constitutes beauty in the bosom. Yet, that this is not the case is clearly proved by the fact that women sometimes congratulate themselves upon their ability to dress low because the bosom happens to be low. A low bosom does not, by any means, represent a high, civilized type of female conformation. The lowest type of bosom is to be found only among savages, whose women sometimes have breasts so elongated as to be passed, like flaccid bags, over the shoulder or under the armpit, for the purpose of suckling their children. No such deformity, however, is to be found anywhere among the higher races of mankind. The condition represents an extremely low physical type, not common even to all savage race

Among the higher races, an inferior type of bosom goes no farther than to be extremely low or flat, and these conditions

conjoined evidence little vitality. The highest type of bosom, on the contrary, is not only placed well up on the chest, but can be best described as of slightly pine-apple form. The female chest is normally more prominent than man's, and the bosom, to be beautiful, should occupy its most salient portion. In passing, it is well to utter here a caution against the æsthetic charlatanism which sometimes professes to develop the bosom by mechanical means. The glandular structure, determining its size and contour, forbids the possibility of attaining success in any such way. Unless its glandular constitution can be improved in nutrition, by which the glands themselves would undergo increase of tissue, nothing can be done for modification of the bosom either as to its size or shape, and the veriest quack could not pretend to change its position.

It follows, from what has been said as to the main proportions of the figure, that all modes of dressing should carefully avoid excess. Whatever may be the fashion, such subtle modification of it should be adopted as cannot possibly serve to increase natural defects, or to exaggerate beauties which, having reached their natural limit, would become by exaggeration defects. This latter mistake represents an unfortunate tendency among mankind generally. It does not follow, because a huge waist or foot is unsightly, that the smaller the waist and the foot the prettier. Waists are to be seen now, even in the diminished practice of tight-lacing, that make one fairly creeble, and feet so pinched and stumpy that they look more like hoofs than feet. What looks unnatural, whether natural or artificial, conveys dissatisfaction to the spectator. A wasp-waist, violating the conception of well-formed womanhood, elicits not only disgust at the vulgarity of it, but abolishes sexual attraction. Tight shoes, always evident as tight, bear the impress of vulgarity, and make graceful movement impossible. Even gloves too small for the hand of the wearer are abominable. Few things can exceed the

vulgarity of a pudgy hand crimped in a short, tight glove, whence at the top it bulges like a plucked partridge-breast.

Probably nothing that has taken place in the revolution which has changed women's dress and bodily habits during the last half-century has been more conducive to their well-being than their general disuse of extremely tight-lacing. The practice is inconsistent with health, inconsistent with beauty and with grace, and inconsistent with gentility. The pressure exercised to the injury of the internal organs of the body, upon whose healthy action the tone of the whole system depends, ceases in injurious effect only with the skeleton itself, whose deformity under such treatment is shown by specimens in our anatomical museums. The very vital air, the free gift of heaven, is not used as nature intended. Look at the face and walk of any tight-lacing girl or woman, for the unhealthy index of the travesty of nature through artifice, which but degrades the form. There is no healthy breathing for mankind unless it proceeds from the depths of the lungs of an unconstrained thorax. Rabbits breathe from the upper parts of their lungs, for it is their nature so to do, but not that of human beings, and in consequence they seem to be nibbling at the air, as some women really are without so seeming, unless they are betrayed by being called upon for some sudden exertion while still confined in the strait-waistcoat of tightly-laced corsets.

How any one can expect to possess beauty of person without freedom of movement, or to retain beauty of face, which is, as a finality, simply irradiation of health and beauty of form, or to exhibit grace, while hampered and fettered by dress, is a mystery. The practice among women of wearing shoes too tight is decreasing, but it is still far too prevalent. How, otherwise, will one account for it, that women, the roundness of whose feet gives them, in the wearing of shoes, great advantage over men in their rugged, muscular development of foot, are so often lame

at 40 years of age, while men generally pass through life with only an occasional twinge? How, otherwise, can one account for the fact that dealers in shoes tell us that they often find it politic to mark women's shoes a number below what they really are? How, otherwise, shall the fact be accounted for that, when we personally, before bathing-shoes and stockings came into fashion, made an inspection of a sea-beach where hundreds of fair feet were disporting themselves in the intervals of a dip in the water, we observed so many marks exceedingly like those produced by tight shoes?

As we have elsewhere mentioned, the Chinese commonalty, who wear their peculiar shoes in which the foot is rigidly held, lose the symmetrical contour of the calf of the leg. All tight shoes of European make have the same effect, through not allowing free play to the muscles of the leg. They have some ill effects which even the Chinese shoe has not, for it is roomy. They impede the circulation in the foot, thereby impair the nutrition of the part, and cause it in winter to suffer greatly from cold. They deform the foot itself, injure the development of the leg, and prevent the easy carriage of the body.

In the work by Mr. Finck, from which we quoted in the last chapter, he expresses, as was there mentioned, the opinion that the brunette type of beauty is to supersede all other types in the Caucasian race. We, on the contrary, think that the future will find room for all types of beauty, from the delicately-tinted blonde to the richest brunette tinge, through all the intermediate grades, from the skin belonging to golden locks, to that through every shade of chestnut and brown, through the hues of Titian to the deepest black. Nature has within her power infinite resources, and as variety is one of her most signal, ever-pleasing charms, it is not to be supposed that she will limit it in the attributes of the fairest of her productions. All types of female beauty have their male admirers, mostly bound exclusively

to one; and the law which this work has sought clearly to define renders it impossible that this admiration, which involves sexual selection, should not for all future time result in the maintenance and enhancement, and perhaps increase, of various types of female beauty.

This we say and believe, despite the fact that a theory has been broached within a few years that, in the white race, the dark type of complexion must, as representing greater stamina than the light type of complexion, gradually supersede the light type. This is equivalent to asserting that, through the force of natural selection, the dark type of complexion, as representing the more vigorous constitution as compared with the light type, will endure, to the exclusion of the other, as the survival of the fittest in individual and aggregate human life in certain latitudes. If this theory represented fact, then it would have to be conceded that sexual selection could not, in that event, contend against natural selection, pure and simple. But, in the first place, it may be cogently replied that complexion, so far as it signifies constitution (and it indisputably does indicate traits of constitution), indicates it only with reference to its relative adaptedness or unadaptedness to climate; in the second place, that the statistics so far accumulated in support of the theory are, to the best of our knowledge and belief, chiefly confined to the British Islands; and, thirdly, that they are even there regarded as not by any means conclusive. We shall, therefore, until otherwise informed, continue to believe that, in the white race, within the general range of the temperate zones, dark and light complexions are equally fitted to existing exterior physical conditions, and that therefore their relative proportions are entirely controllable by sexual selection.

Examining into the conditions of Spain existing through the period which is historical, we shall see reason for the prevalence there of grace and beauty at the present time, and looking

beyond, into the conditions existing in this country, we shall also see, through apparent dissimilarity of causes, that similarity in them really exists, leading to the conclusion that the future promises for this country a diffusion of the higher types of development, not to be exceeded, if equalled, in any other portion of the world.

The Phœnicians, of course, as mariners, first became acquainted with the southern shores of Spain, and there they planted some colonies. To the Greeks, when for the first time these settlements became known, they were, as was all else in that direction, regarded as at the end of the earth, the all-encircling ocean flowing beyond the Pillars of Hercules. When, later, the country came to be to some degree really known, it was discovered to be occupied by numerous fierce, warlike, and intractable tribes engaged in ceaseless struggles with one another. Carthage, being of Phœnician origin, naturally affiliated with the people of the Phœnician settlements on the Spanish coast, and thus, about three centuries before the Christian era, having secured lodgment there, gradually obtained dominion over that portion of the country, and eventually, in a precarious way, over most of the remainder, the tribes in the extreme northern parts maintaining their independence in their mountain fastnesses.

Spain soon thereafter became the battle-ground in the rivalry between Romans and Carthaginians, the former supplanting the latter in the occupation of the country. The task of subjugation, however, had to be again and again renewed, and it was not until the reign of Augustus Cæsar that the country became finally pacified. In the third century of the Christian era it was ravaged by the Franks, who made an irruption there, but did not remain. At the beginning of the fifth century, the Suevi, Vandals, and Alani invaded the country, and for some time maintained a foothold there, often warring among themselves. About this point of time, however, the Visigoths, allied through

their leader, Ataulphus, with the Emperor of Rome, Honorius, entered Spain, and chiefly under Walia, the successor of Ataulphus, who had been murdered soon after his coming, the invading Suevi, Vandals, and Alani were driven into remote corners of the country.

Soon shaking off the dominion of Rome, which was in its decadence, the Visigoths maintained their power in Spain for three centuries. Three hundred years of comparatively peaceful rule seem, however, to have enervated them. They were Christians, having accepted that faith in the latter part of the sixth century, and the Mohammedans, separated from their territory only by the narrow Straits of Gibraltar, looked longingly upon their possessions. With a feeling of unwarrantable security, they left the entrance to the kingdom unguarded. In consequence, in the year 711, a small army of Saracens crossed over from Africa and invaded the country. The history of Spain thenceforth for centuries represents constant turmoil, Saracen princes fighting against each other, Christian princes fighting against each other, and Christian and Saracen princes often in alliance with each other to secure ambitious ends, regardless of race or creed. For centuries all thought of relief from Saracenic occupation of the country must have been abandoned, for successive levies of infidels from Africa flowed into Spain, until at last the occupation became more distinctively Moorish than Saracenic.

Finally, however, as the event proved, through the continued dissensions of the Moorish princes and the lessening of clashing interest among the Christian princes, the occupation became of more uncertain tenure. The Moors were gradually driven farther to the south, so that by the year 1266 they retained no territory except Granada in all Spain. Here, however, the conquering arms of the Spaniards paused, and the Moors retained possession of the province of Granada for over two centuries.

We are now called upon to observe, not only how many different types had become blended, to make what we know as the Spanish type of form and face, whether of ugliness or beauty, but further, a certain coincidence which cannot be a mere accident in the result observable. Leaving out of consideration the necessarily small influence to be ascribed to the infusion of the scattered and eventually dislodged barbaric tribes which have been named, we have left that due to the greater or less occupation of the country for over a century by the Carthaginians, the Roman occupation of five centuries, the Visigothic occupation of three centuries, the Saracenic and Moorish occupation of five centuries and a half, and, including the retention of Granada, seven and a half centuries.

The occupation of the country by the Carthaginians must have produced comparatively little result, because it was very gradual, never thorough, and always intermittent. The occupation by the Romans, Visigoths, Saracens, and Moors was of a very different character. The Romans, according to their usual practice in colonization, largely intermarried and identified themselves with the inhabitants of the country. The Carthaginians, too, had done this, but with far less general opportunity. So it was with the Visigoths, who represented only another phase of Roman rule. The Saracenic invasion and occupation of the country were accompanied by the seeking of favor by thousands among the Christian populations, through renouncing their religion, and becoming what is known as renegades, leading to intermarriage with the Moslem. In a word, by the time that the Moors, after five and a half centuries of occupation, evacuated all Spain but Granada, there must have taken place a large commingling of Roman, Visigothic, Arabic, and Moorish blood. Even with the recoil of the Moors upon the southern coast, leaving only Granada in their possession, their presence in the country for some time afterward did not entirely cease.

We know the Roman type, the Saracenic, and the Moorish. We may leave out of question the Carthaginians, because they occupied Spain so transiently and ineffectually. Both Eastern and Western Goths, although so dominant in places, left little trace but the memory of their existence. Ethnologists, however, declare them to have been tall, blonde, and high-featured, with light hair and eyes. Charles Kingsley, the reader may remember, describes, in his "Westward Ho," a distinguished Spaniard of this type. But it is evident that, if there be Spanish *sangre azul*, or blue blood, in existence, it must be that derived from the aborigines of Spain, even if we include among them the Celts who had burst through the northern frontier and settled in the heart of the country. Upon the supposition of its existence, the only possible source of it would seem to have been the extreme north of Spain, where the mountaineers long held out against all invaders. Yet, as against this supposition, we must consider the fact that, as early as the times of Augustus Cæsar, he so completely broke the spirit of the tribes there, as to reduce them to submission, or at least to quiet and harmlessness. Therefore, although there may be Spaniards of blood unmingled with that of Carthaginian, Roman, Visigoth, Saracen, or Moor, they must form a very small minority of the present population of Spain.

It is to be observed that the present race in Spain is distinguished among men as well as among women by beauty of form and gracefulness, the elegance of Spanish dancing being proverbial. As we descend from north to south, this symmetry and grace are found to increase, so that when a lady of Andalusia is spoken of, we feel as if a synonym for grace and beauty had been used, and this is so tacitly conceded in Spain that a lady of the north feels complimented when thought to be an Andalusian. After allowing due weight to the fact that all southern, as compared with northern, climes produce greater

elegance of form, there is still a large margin left, in considering the case of Spain, to be accounted for by difference in blood. Moorish occupation was rolled back gradually to the Mediterranean, and there it stayed, as has been mentioned, for two centuries in Granada, which occupies on the coast of the Mediterranean the very centre of Andalusia. It is in Andalusia, accordingly, that we find the frame and limbs of almost unrivaled symmetry, hands of exquisite mold, and arching insteps of exquisite delicacy of curve. Roman, Teuton, Saracen, and Moor have, with the original inhabitants of Spain, been fused into a type athletic and elegant. The physical attributes of Roman legionaries, Visigothic warriors, and the vigorous clansmen of Spain have through the centuries been softened as a finality by the symmetry of the East, which brought to the product elegance of form and the languor, dignity, and romance of the present race.

There would seem to the superficial glance no analogy whatever between the conditions existing in Spain during the period when it was passing through the phases by which its inhabitants became at last a homogeneous people, and the conditions existing in this country prior to and succeeding the Revolution. Yet the conditions are essentially similar as to the elements which prove effective in the direction which we are tracing out. The unessential differences lie in the fact that, whereas the conquests and occupations of Spain by successive peoples of comparatively advanced civilization were effected by force of arms, continually resisted with varying degrees of resulting intermixture of races, the conquest of America was, and continues to be, by peaceful occupation of the country by peoples on the same general plane of civilization as those to whom they come to join their fortunes. Proud of the tried capacity for self-government which seems to be eminently characteristic of the Anglo-Saxon, tested in a political fiery furnace through the inheritance of slavery, and

coming forth apparently unscathed, we vaunt ourselves upon our Anglo-Saxon heritage as if we were an Anglo-Saxon people, when we have no claim whatever to the title. What chiefly is Anglo-Saxon in the country is that minority and element which represent laws, traditions, and language dominating the nation, and welding it into a coherent whole. But to say that we are an Anglo-Saxon people in blood is to ignore the fact of the French and Spanish elements of Louisiana, the Huguenots of South Carolina, the German and the Celt, who in sum represent the great majority of our population.

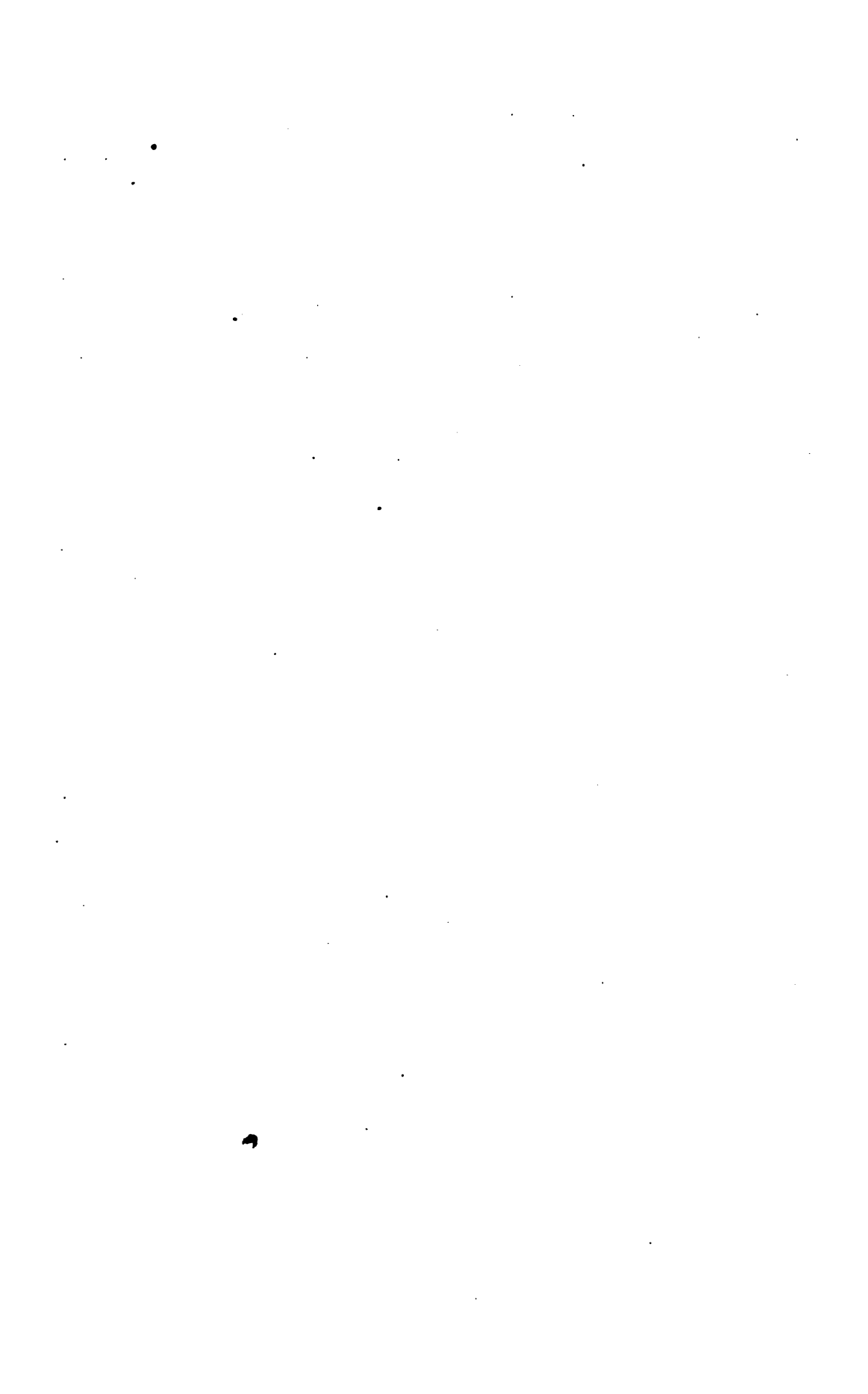
It is a law of physical and mental, in fact, of all being, that like organizations of equal excellence in different spheres produce by their fusion higher types. The law holds good even in language. Strict barriers to its native growth, or increase by the introduction of foreign elements, maintenance of its rigid purity at any point, restrict the bounds of expression. New thoughts require new symbols, and each tongue has its special excellences. The English language is the strongest of all, because it is what philologists call a jargon,—that is, of the most composite character. It has reached a higher type by embodying so many excellences of other languages. So also, but in a far greater degree, do individual and racial life experience, embodied in the life itself of individuals or races of equal elevation in the scale of being, come to be, when blended, productive of higher types. Hence has come about the improvement of races always following the conquest of one people by another not essentially different in the scale of being.

If any of our readers happened to hear, or hear of, the very interesting lecture which Dr. D. G. Brinton delivered last winter in Philadelphia, at the Academy of Natural Sciences, on the subject of ancient and modern Spain, it will be perceived that what has just been said regarding the pure blood of Spain is contradictory of his statement in the lecture that there is *sangre*

azul, or pure Spanish blood. Even admitting, for the sake of argument, what is more than doubtful, that there is in any part of the civilized world pure racial stock, let us first of all ask ourselves, What is meant by the expression, or rather what ought to be meant by the expression, pure Spanish blood? Undoubtedly, it ought to mean the blood of the Iberians, the ancient inhabitants of Spain. But when Dr. Brinton came to demonstrate the present existence of pure Spanish blood, it was found that his attempted demonstration looked to the proving of the present existence in modern Spain of pure Visigothic blood. But, obviously, whether or not it has been maintained over many centuries, it certainly is not original Spanish blood, as we have seen from the brief history of the original and subsequent condition of the country within historical times. In a word, great as Dr. Brinton undeniably is as ethnologist and philologist, and much else in different branches of learning, and highly as we among thousands of others respect his talents and acquirements, he has in this instance of an attempted demonstration, that Visigothic pure blood is Spanish pure blood, fallen into what lawyers call a *non sequitur*.

The American has not yet a distinctive racial type, as has the Englishman, the Scotchman, the Irishman, the Frenchman, the Russian, the German, or the inhabitant of any other country but this. Time is to produce it by the fusion and prolonged life through generations of representatives of many races. The working of this law we are witnessing on the grandest scale upon which it has ever manifested itself. Into this, our country, of magnificent extent, extremely fertile, and rich in almost every mineral treasure, has poured, apart from riffraff, some of the best blood of Europe, in multitudes of industrious, law-abiding Germans, energetic Irishmen, Swedes, Norwegians, and individuals of many other nations. Among these, as among people of all nations, we recognize national traits of character, which, differing

from each other, cannot all be virtues, and some of which must therefore be deemed faults. These, not being essential to the organization, in the course of the intermingling of races disappear by neutralizing each other, while, the higher qualities remaining, a higher type is evolved. It is from the concurrence of a fine population represented by various races, amidst unusual affluence of nature, with unprecedented general prosperity, and such relations between the sexes as more than elsewhere lead to the gratification of romantic love, that there is good reason to believe in a future of the races here, blended into the unity of a higher type than elsewhere in the world, which shall exhibit a general diffusion of health and beauty such as never until then had been approached.



CHAPTER XIII.

THE SKIN AS AN ORGAN OF THE BODY.

THE skin is to be regarded from two points of view,—as an organ of the body, and as its finished exterior. The first of these relates to the health of the whole body, the second to its final touch of beauty in a surface soft, pliant, and exquisitely delicate in color. Health and beauty, therefore, the two topics of this work, being both concerned, and beauty being (as cannot be too earnestly impressed upon the reader) entirely dependent upon, although not constituted by health, the natural order in which to consider the skin will be, first, as it is subservient to health, and then, as it is conducive to beauty. Accordingly, the present chapter will be devoted to an examination of its relation to health, and the one immediately following to that of its relation to beauty.

The skin consists of the subcutaneous connective tissue, the corium, and the epidermis. In the subcutaneous connective tissue originate the most deeply seated of the structures which have relation to the skin,—arteries, capillaries, lymphatics, nerves, sweat-glands, and the bases of the roots of the hair which penetrate deepest. The blood-vessels there are large, and after supplying the nutrition of the hair, the sweat-glands, and the fatty lobules that are present for the nourishment of the parts, branch into the corium. The subcutaneous connective tissue sometimes, as on the seat, which is quite a thick cushion, blends with the corium by means of little fatty columns, which there reach the base of the roots of the finer hair. Passing through the skin are involuntary muscles sometimes accompanying these, which muscles, under the influence of sudden chill of the surface of the body, or of fear or other great cerebral excitement, erect the hair.

The corium is termed the true skin. It corresponds to what, when tanned, we call in the lower animals leather. It consists of two layers, the only difference between which in character is that the upper layer is the more compact. It is richly nourished with blood-vessels and lymphatics, and as the greater number of hair-roots are there, so also are present the greater number of sebaceous glands, which are glands secreting for the benefit of the hair and skin an oily liquor called sebum, similar in constitution to suet.

The epidermis, or scarf-skin, consists of four distinct layers. These are, in the descending order, the stratum corneum (the horny layer), the stratum lucidum (the transparent layer), the stratum granulosum (the granular layer), and the stratum mucosum (the mucous layer). The epidermis means simply the top skin, the outermost portion of which is, as stated, the horny layer. When, as is often seen, a blister detaches the upper from the lower skin, it is the whole of the four layers just described which have been separated from the corium, or true skin. It is therefore apparent that the layers are very thin.

Without proceeding farther in investigation of the epidermis, it will suffice to say that, through its four layers, cells graduate from the corium, gradually changing in constitution and shape as they ascend, until, in their final transformation, they become the scales of the horny layer of the scarf-skin. We regret, in the interest of the reader's memorizing, that there are so many layers to the epidermis, but the fact being that there are, and they having been enumerated, it will suffice for the purpose here in view to consider the skin as simply formed of the subcutaneous connective tissue, the corium, and the epidermis.

The sweat-ducts, proceeding from the sweat-glands, in the subcutaneous connective tissue, pass through the corium and epidermis, and debouch on the outside of the latter with trumpet-mouthed orifices. Thus are discharged from the body

its perspiration, with many humors, carbonic-acid gas, and other noxious matter, as well as the oily products by which the skin is lubricated, which find their way to the surface through the sebaceous ducts, but, to some degree, through the sweat-gland ducts. When a person has been unwontedly exposed to the ardent sun's rays, nature comes with a profusion of oil to the aid of the parching skin. Hence, if such a person as suddenly ceases to be exposed, the skin assumes a glistening appearance, especially on the cheeks near the outside flaps of the nostrils,—the wings of the nose, as they are anatomically designated. Such has been within our experience the superabundance of oil under these circumstances, that it made the face look as if it had been greased. If no further exposure to the sun is to take place immediately, reduction of the oiliness of the skin to its normal amount should be effected by means of a saturated solution of borax, applied with a fine sponge.

The sebaceous glands are either free or attached in clusters to the roots of the hair. When free, their ducts deliver sebum directly at the surface of the skin; when associated with hair, they deliver it directly at the roots. According to Dr. Erasmus Wilson, these ducts also act as sweat-ducts.

Upon the corium stand an immense number of minute, elongated teats, of exquisite sensitiveness, for they are furnished with nerves, which, passing upward through the papillæ, as these teats are called, reach the under surface of the horny layer of the scarf-skin. These in the skin constitute the seat of feeling, producing what, related to the hand, we call the sense of touch. The papillæ rising, as has been said, to the under side of the horny layer of the scarf-skin, receive its protection from friction and contact with the atmosphere. It is from the circumstance that the stratum mucosum of the epidermis thus becomes riddled by these upright papillæ that it derives its other name of the rete mucosum, its appearance under the microscope being

reticulated, or having the appearance of net-work. How exquisitely sensitive these papillæ are every one realizes who, from a burn or other cause of abrasion, loses a small portion of the scarf-skin, and exposes them to contact with the atmosphere.

These are only some of the details of this wonderfully organized membrane called the skin. A description of it, condensed for the benefit of the general reader, might be given as follows: It consists of the subcutaneous connective tissue, the corium, and the epidermis. It is supplied with sebaceous glands and their ducts, sweat-glands and their ducts, hairs and their erecting muscles, pigment which gives it color, lobules of fat which nourish it, and, in the thickest parts, interlacing fatty columns, which support other structures and contribute largely to its elasticity. The scarf-skin, being partially horny in character, is only slightly elastic, but the corium is highly so, and the subcutaneous connective tissue so organized as to allow the whole thickness of the skin to play freely on the parts which lie immediately below,—the muscles and the fasciæ.

The skin is therefore of exquisite organization, and, as complexity and delicacy of structure imply complexity and delicacy of function, we shall not be surprised, upon pursuing our inquiry farther, to ascertain that, upon the condition of the skin and the vicissitudes to which it is subjected, the health is more dependent than upon any other agency in life over which we have some control. Even this statement conveys but a faint notion of the relations of the skin to the higher order of beings, for it is only the higher order of beings which possess true skin.

It is at the skin that man ends and the outlying universe begins. He is there in the most intimate of all his contacts with the universe. The judgments formed by vision itself were originally educated by the sense of touch. Through specially organized portions of the skin the senses of touch and smell become agents in producing distinctive impressions on the brain. Through

the contact of its extended surface with the conditions existing around us we come into most intimate *rapport* with air, light, heat, and electricity. It is continuously conveying to the brain the information of well- or ill- being. Dr. Maudsley does not state the case too strongly when he says, in speaking of certain insane hallucinations, "Were a sane person to wake up some morning with the cutaneous sensibility gone, or with a large area of it sending up to the brain perverted and quite unaccountable impressions, it might be a hard matter, perhaps, for him to help going mad."

So intimate, in fact, is the relation of different parts of the body presided over and governed by the nervous system, that many physiologists, notably the eminent Dr. Carpenter, have insisted that concentration of thought upon a portion of the body determines action there. What kind of action,—voluntary? Certainly not, for voluntary action, being voluntary, depends upon the will's directly setting up the action. The action set up in the brain and transmitted thence to the point upon which the mind is concentrated, affects the circulation and the involuntary muscles at that point. There is much evidence that this is the fact, but any one can see the probability of the truth of the theory by reflecting that, as peripheral disturbance, even if it proceed no farther than itching, is transmitted to the brain, translated there as to its nature into psychical terms, similar means of communication are also open for producing effect in the opposite direction, even if it does not reach the degree sufficient to make it rise into consciousness. Where there are afferent (conveying) nerves to bring information into consciousness, there are also efferent (returning) nerves to transmit a message in the reverse direction.

The celebrated Laura Bridgman, blind, deaf, and dumb, lay like a wreck on the shores of time until communication was established with her through the sense of touch. How limited

her range of thought must have been when shut out from the world through the non-existence of two avenues of sense, and before she had slowly learned the language of the touch! There is an aphorism that, "*nihil in intellectu quod not erat priusquam in sensu*,"—that is, the intellect can conceive nothing which has not reached it through the portals of sense. This is not strictly true, as the case of Laura Bridgman, if there were no other, would show, for she was found, when communication was established with her, to be possessed of thought and of high intelligence, and, of course, these did not come into being at a bound. What, however, is true, is that without the channels of communication with the outside world, called the senses, certain orders of conception are impossible, because they necessitate previous perceptions. Beethoven composed music after he had become deaf, but if he had from birth been deaf he would not have been able to compose after losing his hearing, because he could not have learned the relations to each other of musical sounds. Their mathematical relations within themselves are fundamental laws of their being which can convey no impression of their sensory effects. So far as conceptions derivable from sensory data other than feeling were concerned, Laura Bridgman was dead, and so remained. By communication with her own and other minds, she eventually lived in all matters in which the pure intellect is concerned. The instrument of thought was there from the first, in the brain; thought itself within certain limits was there, much potential, not actual, much for all time impossible. Had the sense of touch, as well as the other senses, been absent, she could have barely been said to exist. That sense not having been denied her, she awakened to knowledge with the thrill of life under the patient teaching that she received.

To this added illustration of the range of capacity in the skin, we add that the day is past for physicians to regard it,

even in disease, as though it were an independent organ. Nothing in the body is independent. It is now well known that the skin, as well as all other parts of the body, depends for its integrity upon the general nervous system. The skin is pervaded, except at the horny layer, by an infinite number of nerves in direct communication with the central nervous system of the body. Disturbance anywhere in the body acts upon the skin, and, conversely, any disturbance in the skin acts upon the central nervous system. A simple case of indigestion often manifests itself over considerable areas of it. A person badly scalded or burned frequently dies on account of the whole nervous system sympathizing through the inflammation of the skin; dies thus of shock. Lesser agencies produce lesser effects; but remember this, that the skin is always being acted upon by the general health of the system, and that the general health of the system is always being acted upon by the skin. If a prize-fighter is to be fitted for his task, he is fitted for it largely through processes which involve the healthy action of the skin. If a horse is to race, similarly he is put in the best condition largely through the treatment of his skin. Equally is it true, whether the case be man, woman, or child, that bodily health and vigor are inseparable from a healthy condition of the skin.

To enable the reader to realize the facts mentioned, it will be well now to set forth some of the work which the skin performs in the animal economy, by specifying what the organ effects in eliminating from the system injurious products, and in imbibing the life-giving principle of oxygen.

The skin has been shown to be an organ of sensation, and to some degree one of protection, the horny layer of the scarf-skin not only shielding the sensitive papillæ, but preventing too rapid escape of heat and moisture from the tissues. It is also an organ of secretion, excretion, and absorption. It forms various products, and expels them with those formed in deeper-lying tissues.

It takes up, to some extent, matter in solution. Far more important, however, than that particular kind of absorption is its capacity of respiration, of imbibing oxygen, and liberating carbonic acid. It is true that its liberation of carbonic acid amounts in the adult, on the average, to only 10 grammes in the course of twenty-four hours, but the amount is extremely variable, depending upon how well certain internal organs of the body are performing their task of eliminating effete matter, and upon temperature, exercise, and other conditions. It is, however, a function of the skin which can be stimulated to increased activity by diaphoresis, or artificially induced profuse sweating, and thus the skin may be called upon in emergency for relieving stress in internal organs caused by disease.

If, however, it is true that the amount of oxygen imbibed by the skin and the amount of carbonic acid liberated by it are both small, this cannot be said of the skin's power of excretion of matter in the watery solution of the perspiration. The skin is continuously engaged in expelling, in connection with sensible and insensible perspiration, salts, acids, including urea (and sometimes offensively as to that), sugar, proteids, bile, pigment, and sometimes broken-down blood-corpuscles. The amount of solid matter in solution thus expelled by the skin actually exceeds that expelled by the lungs, in the proportion of eleven to seven parts. The lungs are more effective than it in ridding the body of the noxious gas called carbonic acid, for they liberate daily in the adult several hundred grammes of it, in return for about the same amount of oxygen, while, as we have said, the skin liberates in the same time only about 10 grammes of carbonic-acid gas. But it is to be observed that, when it comes to matter in watery and oily solution and suspension, the skin's capacity for eliminating it from the system exceeds that of the lungs in the proportion already mentioned, of eleven to seven parts.

As of intimately associated interest, it is well here to

amplify slightly the statement as to the work which the lungs perform in absorbing oxygen and liberating carbonic-acid gas. Carbonic-acid gas is composed of two equivalents of oxygen and one equivalent of carbon. Ordinary air is composed of a mere trace of carbonic-acid gas, with its main constituents, oxygen and nitrogen. The adult body absorbs oxygen in respiration by the lungs to the extent of a little over $5\frac{1}{2}$ per cent. of the sum-total volume of air inhaled, and returns, in the form of carbonic-acid gas, with traces of other gases, a little less than $5\frac{1}{2}$ per cent. of the sum-total volume of air exhaled. The poisonous products of the body in the form of carbonic-acid gas are therefore liberated, and the life-giving oxygen is absorbed, the oxygen which has disappeared having gone toward nourishing the blood and tissues of the body.

It will readily be perceived from what has been said that, simply from unhygienic habits, the skin may, even in health, become the vehicle for offensive matter. In the early part of the century some printed advice to school-girls in England appeared from a well-known female authority, aimed at correcting in them the pernicious practice of neglecting the daily prompting of nature to defecation. One of the remarks made was, that any physician could detect in such girls the fact of the neglect, simply from the appearance of the complexion. The lady could have said more, that any one, physician or not, can detect the neglect by the color and odor of the skin. Happily this neglect has, through greater diffusion of hygienic knowledge, been largely abated. It is almost incredible, and yet it is true, that it had arisen and been promoted by the false notion that such offices of nature are unworthy of the attention of the refined. What a commentary on the general intelligence of the period among the sex represented by the better classes! What delicate consequences these, thus invited to place themselves in clearest evidence!

Dr. Franklin somewhere describes the wakefulness that occasionally overtakes one in bed, in the night-time, in hot weather, when the skin erratically itches from head to foot, restlessness takes possession of him, and he reaches the desperate conclusion that sleep is indefinitely postponed. The Doctor prescribes for relief, rising and taking what he called an air-bath, seated in a chair, covered only with a loosely-flowing sheet. The remedy is good, the details of the application excellent, and the wished-for relief generally obtained. But why should this condition ever exist if cleanliness is present (and the Doctor and thousands of other sufferers could not be accused of want of that), and why is it relieved by so simple a process? The consideration comes within the line of what we are discussing. Lying covered in bed, if only with a sheet, in the heat of summer, the whole skin is seeking to respire vigorously,—to imbibe oxygen and give up carbonic acid and other effete matter. But a third of the body is in contact with the bed, and thus shutting that surface out from ample supply of the oxygen in the air, and at the same time impeding the liberation of carbonic acid there, the covering of the sheet producing the same effect only in less degree. So the nerves of the skin, and through them the general nervous system, drive away sleep, precarious in summer's heat. The scale has turned against it, and it flies, until either the cause of the evil is removed, or weariness tips the scale in the opposite direction.

The sweat-glands, it will be remembered, originate in the subcutaneous connective tissue, the lowest of the three layers of the skin, and their ducts debouch in trumpet-mouthed tubes, called ducts, at the surface of the scarf-skin. These glands are effectively composed of several convolutions of the duct. They are the very largest in the armpit, where they are sometimes $\frac{1}{16}$ inch in diameter. Krause has computed the number of these ducts for a grown person of ordinary size

to be nearly 2,500,000. Their length, if joined end to end, would be over 9 miles. Their communication with the atmosphere is essential to the maintenance of life. During the French Revolution, on an occasion when a procession was in preparation, a little boy was gilded all over his naked body as a part of the spectacle, his death in consequence rapidly ensuing.

Glands in different localities have specific odors intensified by neglect of cleanliness. A person may take a thorough bath, and yet, by using friction with the hand, the odor peculiar to the part may be evolved so as readily to be perceived by smelling the hand. Not only is this true, but there are variations in the odor of the same part in the same person at different times, depending upon different conditions of the system. Beyond this, there are specific differences in general odor among different persons, so marked that, when, by absence and lapse of time, a person has been forgotten, his specific odor sometimes revives memory of him. Some persons have comparatively little odor at any time, others have it pronounced at certain periods and not at others, and, again, some persons always have a very perceptible odor. For all these variations an equal degree of cleanliness is assumed. Yet, such is idiosyncrasy of constitution that, even under this sameness of conditions, differences in quality and degree of odor are clearly recognizable among different persons.

Generally, far beyond any individual differences of odor, as caused by specific differences in constitution, are the differences brought about by the great range in cleanliness among different persons, from exquisite neatness to utter neglect. The fearful odors that assail us in miscellaneous crowded street-cars on rainy days, when everything reeks with moisture, are not from carbonic acid alone, but also from unclean clothes and skin. Imagine the effect in persons of any, but especially of certain bodily constitution, who neglect, let us say, ablution of the armpits, whose glands yield a much thicker fluid than that which

exudes from the smaller glands, constituting quite a viscid secretion.

It is believed by naturalists that odor among the lower animals, even that which we regard as fetid, has relation to sexual attraction. But the lower animals are, after all, the lower animals. In the lowest, not in all of them, as we have shown at the beginning of this work, they have been recognized as indifferent to relative good looks, cleanliness, or any other attribute which betokens refinement of taste. But odoriferousness in human beings has never been deemed attractive. Love of strong artificial perfumes in some persons, and disgust for them in others, have the same basis from different points of view in refinement. No one of whom we have ever heard, except the eccentric Walt Whitman, ever sang the praises of the delicious aroma of the armpit. That this is a normal prompting is to be denied in the light of the terrible picture by Zola of the feeble debauchee sniffing at the slippers of his not overnice innamorata. Compare such a taste as that with love of the perfume of a pure infant's skin, or that which the French call the *bouquet de jolie femme*, which is nothing but the sweet odor of pure skin and fresh linen. One tells of exhaustion of life; the other, of its enduring, keenest relish.

When we reflect upon the facts here presented,—that the body is really in process of waste and repair all the time; that repair cannot proceed well unless the waste is constantly removed; that nature has provided us in the skin with an organ largely under our control, which discharges a portion of this waste and imbibes, to a certain degree, oxygen, one of the principles of animal life,—it becomes evident that we do not properly attend to our welfare if we neglect using this means toward health at our disposal. Cleanliness is one of the concomitants of self-respect. It is next to godliness because it is a species of godliness, and may, in turn, through stimulating self-

respect, cause godliness to rise to greater heights. Cleanliness, clothing, warmth, friction, exercise, food, are chiefly concerned in the healthiness of the skin, and the first, the most important of these, is the most neglected. We will not, however, here trench upon the subject of the bath, which will be treated of in its proper place. Here we pause temporarily as to the subject of the skin, with the end attained for which we set out,—to prove how important is its condition as an organ to the healthiness of the body.

CHAPTER XIV.

THE SKIN AS A BEAUTIFUL TISSUE.

A DISTINGUISHED French author tells us that "to have just enough plumpness, not a whit too much nor too little, is with women the study of their lives." Being a Parisian of good society, literary, a *bon-vivant*, who had had fear for himself of the encroachment of obesity, a fatherly adviser of ladies of his acquaintance as to the course to pursue to check tendency to it, and, lastly, a connection of Madame Récamier's, the most beautiful woman of her time, he may justly be deemed to possess a combination of advantages entitling him to judge of beauty, and of all that can increase or mar its attractiveness. This author, Brillat Savarin, with whom the reader had better make acquaintance if he does not already know him, discourses eloquently on the devastating inroads which obesity makes in female beauty. Better by far is it, in our opinion, too, for a woman possessed of any physical attractions, to be as thin as a rail rather than for her to descend to the commonplaceness of fat, destructive of every line and every hue of beauty. Yet thousands of women would seem, through their addiction to the eating of sweets and other food conducive to obesity, and their avoidance of exercise, deliberately to invite and welcome its inroads. Savarin says of its effects in the fair sex:—

There is a sort of obesity which is confined to the stomach; I have never observed this among women. As they are generally of delicate fibre, when obesity attacks them it spares nothing. . . . I belong to the other class. I have none the less regarded my stomach as a redoubtable enemy. I have conquered it, and fixed it at the majestic type.

We can claim the advantage over Savarin of having seen in women the type of obesity which he says he never met with, but it is, undoubtedly, very rare. He is right in his observation that

when obesity attacks women, it does, owing to their less compactness of fibre as compared with that of men, tend to involve the whole person.

Obesity and complexion are intimately related to each other. A fat person of either sex has lost the contours which produce delicate effects of light and shade, and are indispensable not only to delicacy of form, but to subtle play of color. All is tense, rigid, suffused with the same tint on a rounded surface, without the slightest fineness of modeling. The expression of a fat face is as distinctive as is the expression of a dwarf or a giant. The surface, being rounded, and uniformly suffused with color, not broken up into tints with delicate transitions, has ceased to be attractive from the point of view of beauty. The best that one can say of a complexion of the sort is what is often said of it,—that it is a nice, clean, fresh-looking skin. It produces that impression through its excessively tense smoothness of appearance, but that impression is not one of beauty. If cleanliness is desirable, the appearance of it is desirable; but the freshness that suggests cleanliness is not beauty, for cleanliness itself does not constitute beauty. At best, the fat face affords the humblest gratification to the sight from perception of ruddy smoothness, destitute of distinction; and it is frequently coupled with vulgarity of expression. Fat equally debases the figure, destroying all its lines of beauty, suggesting incapacity of motion without effort, besides diminishing the feeble power of locomotion possessed by human beings, and rendering the simplest movements painfully devoid of ease and grace.

Putting undue plumpness, amounting to fatness of face, out of consideration, it is to be remarked that mere clearness and redness of skin do not constitute a complexion of the highest order. If that were the case, the typical English milkmaid's ruddy hue of health would be the most beautiful complexion in the world. But pink and white, merely as such, especially if

they have very distinctly marked boundaries, are always destitute of the distinction which marks the ideal complexion. Neither, although it has lately been the fashion, is the colorless, creamy-tinted complexion the highest type. It is, however, as to its effect, the very opposite of that of the milkmaid pink and white, giving rare distinction. It lacks transparency, however; so that, while it escapes wholly the vulgarity of the other, it does not possess its inestimable advantage in clearness.

The inference to be drawn from observation of all types is that what constitutes the ideal complexion, whether blonde or brunette, is the fineness of the outer skin, the disposition of its blood-supply, and its translucency. Of all Madame Récamier's traits of physical beauty, none seem to have struck her contemporaries so much as the wonderful effect of her complexion. It stood the severe test of the closest inspection as she appeared in open *calèche*, or face to face with the throngs that surged through the public halls and promenades of Paris in the rebound from the terrible days of the Reign of Terror. It stood even the test of jealousy and envy, and remained unscathed. Because we could not elsewhere find so authentic an example for our purpose, we shall continue to cite the case of Madame Récamier as a well-known and accepted queen of beauty, by way of exemplifying what we have to say of complexion of the highest type. To this effect we quote here the testimony of another beauty of that period as to the effect that Madame Récamier's appearance always produced. The speaker is Madame Regnault de Saint-Jean-d'Angely, at a time when she, no longer young, had retired from the gay world. She says: "I was at an entertainment where my appearance attracted and captivated all present, when Madame Récamier arrived. The brilliancy of her eyes, which, nevertheless, were not very large, the inconceivable whiteness of her shoulders, eclipsed, crushed everything; she dazzled. At the end of a moment, it is true, good judges returned to their

allegiance to me." Probably the world never heard that they did except through this phrase. The testimony as it stands from a celebrated beauty is convincing; we can make our own allowances for the weakness of vanity.

Translucency of skin, indispensable as it is to a perfect complexion, may, however, reach a point where it becomes a defect, as we sometimes see in the wasting of consumption, where the veins show in the temples and elsewhere as if painted in blue water-color on the outside of the skin. But, in an otherwise fine skin, translucency to a proper degree is indispensable to the most perfect manifestation of its beauty. In sickness the skin is not as it is in health. It becomes either dull, opaque, and lustreless, or else, in certain diseases, shrunken to a vitreous-looking, transparent membrane. With health, its due translucency and brilliancy return. To what degree it is capable of transmitting light, one can ascertain by placing any child sideways, so that the light from a near window shall show back of the ear. We well remember a picture in the Dusseldorf gallery, in New York, where this feature of beauty was exhibited in a figure of Desdemona seated with her back to a casement, listening to the Moor, the ear through which the light appeared being illuminated like a pink-tinted shell. So, in a delicate ear, we can see light through a thickness of cartilage and two thicknesses of skin.

We yield to the temptation to speak here further of Madame Récamier, in view of the base uses to which her name has been put in connection with cosmetics, leaving the popular impression in this country that she was little but an animated, pretty doll. To the best of our knowledge, Brillat Savarin never mentioned her at all in his writings. The only occasion in which he seems publicly to have appeared with her was that on which General Moreau, with various other persons, was on trial for conspiracy, Napoleon being First Consul, when she caused a sensation by

appearing in court because General Moreau had missed her as one of his sympathizing friends. The time was not devoid of terror, although the Reign of Terror had ceased. Some, even of the partisans of the First Consul, reprobated the murder of the Duc d'Enghien.

Madame Récamier, escorted by Brillat Savarin, made her appearance in court, in total disregard of what she knew would be the displeasure of Napoleon at her appearance there. From first to last of his career, all efforts to induce her to identify herself with the new *régime* were fruitless. The key-note of her whole life was devotion to her friends. Chateaubriand, and others almost equally eminent, received the benefit of her profound knowledge of the world, and indulged in the charm of her intimate friendship. Her *salon* in Paris was the ground where clashing interests could meet without warring, where she presided calmly indifferent to Napoleon, until her devotion to Madame de Staël led to her own exile. Madame de Staël stands to the world as the strong mind on which Madame Récamier relied, when the truth is, that in all crises Madame Récamier bore herself with infinite courage and discretion, and Madame de Staël it was who in her own time of greatest need leaned on her.

With all her gifts of mind and character, Madame Récamier possessed, in addition, great personal beauty—so great that the renown of it has led in the public mind to the overshadowing by it of her other claims to admiration, in superior judgment, great amiability, and an almost unrivaled unselfishness. An observer of her time painted her portrait as follows:—

Her figure was supple and elegant, with fine neck and shoulders and a gracefully-poised head. She had spare, but charmingly-modeled arms; wavy, chestnut hair; a small, well-shaped mouth, fine teeth, and a delicately-formed nose of the French type. Lastly, she had a brilliancy of complexion which threw everything else into the shade. The general expression of her face was one of candor, with just a tinge of mischievousness, the whole effect being irresistibly attractive.

This was the woman who, without being distinctively intel-

lectual, like her friend, Madame de Staël, was of the finest mold, wise, courageous, patient, sympathetic, pitiful, and faithful beyond compare; who, even upon the verge of old age, when she died, retained her influence over all ages and conditions of men and women, after her youth, beauty, and fortune had passed away.

It will have been noticed that, in the description just given of Madame Récamier, it is said that the brilliancy of her complexion threw everything else into the shade. The supreme beauty of such a complexion, it should be understood from all that has now been said, is not derived from mere pink and white, or red and white effects. It is born of nothing less than blood mantling, with a certain subtlety of distribution, in a skin of superlative fineness and translucency. All may be accorded to a skin in fineness of texture and in color, but without a certain adjustment of vascular supply and great translucency it cannot produce the highest effect as complexion. It is almost needless to repeat that general healthiness of body and skin is indispensable to the beauty of the skin, which in the face we speak of as the complexion. It remains, then, only to consider the remaining source of the vivid effects with which we are acquainted, as exhibited in the complexion. This subject is the more inviting, because the source of subtle effects of the complexion seems to have escaped the attention of all writers on the skin with whom we are acquainted. We venture to say that the unpremeditated popular answer to the question as to what produces them would be that they are derived from the character of the skin, as shown by reflected light. And that reply would contain a certain measure of truth, although the conception back of it would be wide of the mark as to the cause. The peculiarities which we see in the complexion are not *made* by reflected light. They already exist, to render it possible for them to be conveyed to us by reflected light. Reflection of light

from them is merely the condition under which their previous existence is brought to our knowledge. We should, in fact, understand that just as incident light contributes to constituting those peculiarities, reflected light is merely the agency by which we perceive them. In a word, flesh and blood and incident light are the two agencies that are concerned in their production. There is, then, a something else besides flesh and blood which is contributory to those effects, since they cannot be created by their reflection to us, which only enables us to see what already exists. That something else is the refraction and reflection of incident light pervading the tissues of the skin.

The blood is red ; the veins, as seen through the skin, look blue. Their blueness cannot be derived from the color of their coating, for that is a dingy white, with a trace of red. It has never occurred to thousands of persons to investigate the cause of this apparent anomaly, or, indeed, to thousands, that there is in this fact any anomaly. Yet the blood in leaving the left side of the heart, after it has been oxygenated by the lungs, is crimson, and after making the tour of the body is, when about to enter the right side of the heart, the color of claret. Nowhere does it appear through the skin as even tinged with crimson or claret color, but everywhere as blue. Always remaining of some reddish hue, it is, therefore, only apparently blue. It is clearly, then, a phenomenon of light with which we are called upon to deal in investigating the peculiar effects observable in the complexion. The general reader is not alone in having remained unobservant of this main fact, and even of the matter of detail just mentioned, for many physicians are equally in the dark on the subject, as we have ascertained by careful inquiry.

The reader is now, after having read the preceding chapter on the constitution of the skin, in a position to understand, with the addition of a few more facts, the cause of the phenomenon of great beauty in the complexion.

Light, as we see it proceeding from the sun or electricity, which latter is the purer form of it, consists of an infinite number of colored rays blended in one kind of ray, which is called white. Hence, we call the light of the sun white light. The phenomena which we are about to examine can, it is true, be partially observed even by a single imperfectly homogeneous light. We witnessed one of them by accident only the other evening, as shown in the pearly inside coat of an oyster-shell illuminated by gas-light reflected from a bright-red shade. Nevertheless, the assumption of white light is the most proper one in the discussion of the present question.

Light tends to proceed in a straight path, but, as is well known, it is susceptible of being diverted from that course, when it is incidentally found to be broken up into rays of different color, called primary, secondary, tertiary, and so on, to a point where they evidently continue beyond the range of our vision, whether aided or unaided by the most delicate instruments. All light proceeds with the same velocity in the same medium. But, on the other hand, each differently-colored ray has its own specific wave-length, the mean wave-length of differently-colored rays visible being one fifty-thousandth of an inch.

There are various ways in which matter interferes with the tendency of light to pursue a straight course,—through reflection, refraction, diffraction, and polarization. It is, however, only with refraction, diffraction, and reflection that we have to do here. When light is refracted, it is by passing from one medium to another. This alters its course so as to produce in rays relative retardation and acceleration, the velocity of all depending upon whether it passes into a more or less dense medium than the one which it has left. Refracted light is changed not only as to its course, but as to the time of its passage. When light is diffracted it also is diverted from its course, and its rays relatively retarded or accelerated, but it is

not, as a whole, modified in velocity in passing, the phenomenon of diffraction taking place in the atmosphere, and not by light passing from one medium to another of grosser matter. Diffraction takes place through light, in its straight course, striking the sharp edge of an object in its path, which action causes it to be broken up into colored rays. The visual consequences of this behavior of light are of infinite complexity. Two rays of equal intensity, coinciding by a difference of only half a wave-length, extinguish each other and produce darkness. Rays, by superposition, reinforce each other in the production and modification of color. The whole of the phenomena involved result from the interferences of rays of light of different wave-lengths. Originally of the same wave-length in white light, light becomes, when broken up into colored rays, of an infinite number of wave-lengths, and produces infinite complexity of color-effects.

It is with the interference of rays of different wave-lengths, not to the point of obliterating each other, but to that of infinitely modifying the color with which they are inseparably associated, that we are concerned.

It has been shown that the skin consists of six layers of different character. Throughout them the cells themselves are different in form in the different layers. Moreover, the coats of the veins have three layers, as have, with some modifications, the venules; and these layers are of different cellular formation and ultimate general structure. It has been shown that the skin is translucent to a degree enabling us to see light through two thicknesses of it, in addition to a thin cartilage. It follows that, when light, especially white light, falls on any part of the skin, it cannot proceed without being subjected to myriads of refractions through the various media in the skin. What takes place when it impinges upon the face, which represents the skin in its highest delicacy, is analogous to what occurs when white light penetrates thin sheets of isinglass in contact with each other, or the thin layers

of an opal. It is easy enough to say that the effects are caused by refraction, but really to understand the cause of them is to know, besides recognizing that the fundamental cause is refraction, that the consequences in color are due to the refracted interferences of the rays of light. Analogous effects to those produced by light in isinglass, the opal, and other substances, and in instruments specially devised for exhibiting them, are produced by the same cause in the depths of the translucent skin by its different layers: in sum, by refraction and interferences of rays, the resultant effect, through reflection to the observing eye, being that which we know as individual complexion, determined, as to final effect, by individual constitution of the skin of the face. Further consideration will render the points involved still clearer.

Not only are thin plates penetrated by white light capable of breaking the light up into innumerable colored rays, but striated and corrugated surfaces have the same capacity under certain conditions. A fine skin has, to the naked eye, an appearance of perfect smoothness, but by optical tests to which it can be subjected it is seen to be far from smooth. It is not so smooth as represented in diagrams of magnified portions of it showing the cells of the scarf-skin. The eye, viewing the representation from above, receives no correct impression as to the vertical eccentricities of the surface, and, of course, it receives no impression at all as to the color of the skin or the reflection of light from it as exhibited by the skin itself. Neither does the description "horny layer of the skin" convey any just idea of the appearance of its surface when highly magnified, because the horny quality is so exquisitely fine as to violate preconceptions as to applicability of the term.

It will be best, therefore, to describe here the appearance of a fine skin as it looks under the microscope, magnified, say, fifty times. It will then become evident to the reader that some of

its color may be due to striation and corrugation of the surface, as well as to the presence in the skin of the numerous thin plates, differing in constitution, of which we have already spoken. Incidentally, it will also become evident why the skin is so luminous, and therefore how a complexion can be so brilliant as to justify the use of the term "dazzling."

Under the magnifying power of fifty diameters there is no penetration of sight below the surface. We see merely the immediate surface of the horny layer of the scarf-skin. Imagine a piece of ice about an inch in thickness, not appearing as transparent nor even as translucent, because having a backing to it, but as seen entirely by reflected light; and this piece of ice to be broken up into facets without dislodgment of them, leaving them with slightly defined outlines, and placed at slightly different angles with reference to the general surface. This is the general appearance of the skin as seen magnified fifty times, but only the general appearance of it under those circumstances. To convey a true conception of it, we must now speak of the special effects of light as seen reflected from the skin as thus magnified. In many places, particularly on the crests and ridges formed by the slightly angular position of the facets with reference to each other, which facets are, of course, in the case of the skin, the scales of the scarf-skin, the effect of the reflected light is more intense than can be realized by likening it to the glinting of broken and pulverized ice. The light on the crests and ridges between the facets is comparable in lustre only to polished silver highly illuminated. These facets, being the horny layer of the scarf-skin, are the surface which receives light into the skin, so that the light must, even at its entrance, be subjected to refraction. Additionally, the striation of the horny layer at the junctions of the scales, and the corrugations produced by their angular position with reference to each other, must be in themselves productive of color.

The outermost layer of the skin being formed, as described, of silvery-white facets, is of the best possible constitution to reflect light. We see best by reflected light when the light is scattered. A plate-glass mirror can be so placed as not to be visible, as it sometimes is in the tricks of magicians on the stage. If the glass of which the mirror is made were crushed to fragments, it would instantly become visible, because the light falling upon the glass would be scattered. Just so, polished facets, such as have been described, scatter light in all directions. The complexion, therefore, is summed up in the natural fineness, color, and translucency of the skin of the face, as modified by the laws of light and their combined effects reflected to the eye by the bright outside surface of the skin. Hence, we perceive how appropriate are our terms for a complexion such as Madame Récamier's,—brilliant, radiant, dazzling, the whole effect startling,—and how impossible it is by artifice to improve upon nature, to do more than mask with an imperfection another imperfection, which may sometimes not be the greater.

When an artificer in cosmetics shall be able to change an ordinary skin to one fine in texture, color, translucency, and brightness, then, and not till then, can he make a fine complexion. If complexion were derived from a dense, *mât* surface, art would be adequate to tint it so as to look like nature. But, as complexion is the result of the combination of natural qualities,—fineness, color, translucency,—modified by the affluence and effluence of light acting under divine law, it is impossible successfully to imitate its effects. Carried to the extreme, the result of the attempt is ghastly. Alphonse Daudet, in his "*Froment Jeune et Risler Aîné*," vividly depicts, on their way to the races at Longchamps, those artificial blondes whom the Third French Empire produced. "Carriages," he says, "as they passed, grazed, driven by women with painted faces squeezed into narrow veils, motionless, holding their whips upright with the pose of

dolls, nothing alive about them but their charcoaled eyes fixed on the horses' heads." This is the cosmetic art become Satanic, and yet it has appeared to some extent even in this virgin land. What can be seductive about it, except to the lowest of men, and to them only in default of better exemplars of the fair sex, it were hard to say. Nothing living so much resembles the whited sepulchre, where dead men's bones lie within. The fashion is not of the earth earthy, but of the devil devilish. It does not suggest life, but death,—vice in its last agony of body and mind.



CHAPTER XV.

THE BATH AS PROMOTIVE OF HEALTH AND BEAUTY.

WE may rest assured, judging by the present general tendencies of mankind, that, although bathing must be of the highest antiquity, it was resorted to of old, as well as now, by the multitude only for the sake of its directly pleasurable effects, instead of from motives of cleanliness and promotion of good physical condition and beauty. As in duty bound, in this era of demand for reasons for all assertions, we proceed to give those for the faith within us, as shown by our conclusion.

The physician is, of all men living, the one who has most to do with the literally naked facts in the case before us. He it is who is called upon to make physical examination of applicants for enlistment in the military service, and many others rendered necessary by accident or sudden invasion of disease, which in sum yield him on this subject ample fund of information. No such witness can conscientiously say that more than a fraction of the cases so presenting themselves evidence due regard for the social and hygienic demands of extreme nicety of person. He knows that examinations for enlistment are generally followed by grateful ventilation of the rooms where they have been held. Such, however, is the effect of military instruction in personal habits, and of military discipline in the promotion of self-respect, that in the vast majority of cases they result in permanent change in men previously negligent of cleanliness. He has similar experience, through the fact that he is often summoned to go to the assistance of persons who have met with some serious accident, or who, without time for adequate preparation, perhaps in dense ignorance of their shortcomings in the matter of neatness, are suddenly compelled to seek him for

medical advice. If the whole male population of a country could at any early period of life be temporarily enrolled, with the sole object of establishing cleanliness as a habit, the effect would be to raise the standard of health among the people.

It is notorious that, as among different nations, some are more than others addicted to the practice of bathing. This is frequently ascribable to climate. One would scarcely expect of an Esquimaux that he should bathe as frequently as the inhabitant of a more genial climate, seeing that he has not always even water plenteously at his disposal, to say nothing of its temperature when procurable in large quantities. But, this duly recognized, it remains true that, irrespective of climate, certain peoples more than others practice bathing. As we all believe that Englishmen's talk about "tubbing," by which they mean virtually a sponge-bath, is an exaggeration of their recognized relative virtue in respect of personal cleanliness, as compared with other nations generally, it is thus admitted to have a basis in fact. It does not rest on so firm a one, however, as it would, if they did not favorably contrast themselves with the French especially, the popular English prejudice as to whose general remissness in this department of manners *Punch* satirized on the occasion of the Crystal Palace Exhibition by a caricature representing two puzzled Frenchmen gazing earnestly at a pitcher and basin, one saying to the other, "*Qu' est-ce que c' est que cela, Alphonse?*"

To state the case unqualifiedly, as the English do in their own favor, as against the French, is very misleading. It thus signifies nothing less than that all Frenchmen are dirty, and all Englishmen clean. But it must be remembered that the English are far greater travelers than are the French, world-wide travelers, while the French nationally are no travelers at all, and that the traveling and writing class belong also to the bathing class of any nation. Thus it happens that the tin tub of the Englishman has penetrated the jungles of the world, astonishing even the

tiger lurking in his lair to watch the passing caravan; and thus it happens that Englishmen, who are most imitative of all that originates with Britain, have, to a man, come to associate their tub with the glories of England, and to embalm its virtues in the story of their countless wanderings through a "nasty" world. The English thus, in part fortuitously, in part by design, have had their bathing more *en évidence* than have the French, and therefore it would be unsafe to infer, because the writing class among Frenchmen seldom mention their personal habits in bathing, that they or their compatriots are universally neglectful of it.

We shall, perhaps, come as nearly as possible to the truth, so far as it can be contained in a general statement, if we should say that the English, as compared with the French, are a cleaner people, but that the higher classes in both countries stand in that respect more nearly on a par than the English would lead us to believe, with whom tubbing and talk about tubbing is somewhat of a fad. We think that, if the reader knows anything of the great facilities for private bathing existing in the principal cities of this country, he can have no doubt of the general and constant use of the bath among all but the lowest classes, and yet we never hear Americans boasting of their tubbing or bathing, although thousands upon thousands of them, both men and women, take a bath of some kind, generally of total immersion, every day of their lives.

We have appealed to the prevalence of the private bath in our cities as the best possible evidence of general bathing here among even people in the humbler walks of life. If we chose, we could go on to demonstrate, from personal observation, that these baths are habitually used. But if they exist, that ought to be sufficient evidence that they are used. People would not go to the expense of having tubs and paying extra water-rates if they derived no advantage from the bathing-facilities. And just as we deem the prevalence of the bath-tub and of water-

facilities in our cities to be good evidence of general bathing among all but the lowest classes, so we find the general absence of these in farm-houses to be equally good evidence of general neglect in the country of the social and hygienic practice of the bath. We can remember in our experience but one veritable farm-house where such facilities existed. They were secured by means of a tub in one of the upper stories, for whose supply water was pumped into a reservoir by means of an hydraulic ram in a neighboring rapid brook. It would be in vain to answer that the latter opportunity is not afforded by every situation. It can be readily granted, when replying that there are scarcely any situations where the construction of a small tank to receive the rain-fall from the roof would not be feasible. There are many farm-houses where a small windmill is used for the delivery of a supply of water to cattle, where not a drop is devoted to a reservoir for purposes of ablution. The city-bred look dejectedly around them when inducted into their farm-house bed-rooms, as they catch sight of the Lilliputian towel, pitcher, and basin, rarely of a foot-tub or larger receptacle for bathing purposes. If the length of their stay necessitates a bath, it is only by superlative efforts, perhaps the expressage of a tub to the scene, that their intention can be accomplished. If the visitor be a man, the time be summer, and some kindly stream flow or brook brawl in the neighborhood, the difficulty is solved. Otherwise, the unfortunate sojourner in the land is forced to content himself with the bountiful supply of water that the wash-hand basin will hold.

It is to be hoped that, in the course of time, this neglect, evidenced by the dearth of bathing appliances in the country, will be remedied by increased knowledge of their desirability for comfort and beauty, and appreciation aroused as to the practice of bathing as a social obligation in the interest of personal agreeableness and immunity from sickness and disease. Habit in the individual becomes confirmed. It is transmitted

by example to descendants. So, generation after generation of people go on, year after year, either with personal habits of the strictest cleanliness, or with habits not much better than those of the commonest emigrant class. So confirmed are these latter in their neglectful ways, that we have often known kind recognition of their sad estate, taking the form of constant provision of pleasant bathing facilities, to prove abortive. The consideration proved utterly wasted upon the intended recipients of the kindness, for all the change in habits that followed, incorrigible as they were in their wretched practice of dabbling with a rag wrung out in a quart or two of water. How many of the refinements and gratifications of civilization which are within the power of persons living within its pale seem to elude their knowledge, and, by a strange contradiction, fall to the lot of some of those whom civilization has not touched even with the hem of its garment! On the northwestern shores of North America, in the Straights of Fuca and thereabouts, the Indian women are to be observed retiring to some lonely spot, disrobing, and bathing in the pure water of the coast. Poor creatures, they are compelled to dress themselves again in the squalid garments of which they had been temporarily divested! But can there be any doubt as to which to choose, between their clean, healthy skins, in their miserable apparel, and those which amid civilization are sometimes covered with the fashions of the prevailing mode, and scented to the distraction of the more refined? Ben Jonson says :—

Still to be neat, still to be dressed,
 As you were going to a feast,
 Still to be powdered, still perfumed ;
 Lady, it is to be presumed,
 Though art's hid causes are not found,
 All is not sweet, all is not sound.

It is the province of the physician to make himself acquainted with the habits of people as being more or less conducive to

their health. With that end in view, we have, both at home and abroad, never ceased to avail ourselves of all opportunities of obtaining information on the subject of personal cleanliness, among the various other subjects which invited our attention. It might give an appearance of presumption on our part, to speak here of what we cursorily observed abroad. On the other hand, to omit all such mention opens us to the suspicion of avoiding it, unless we say, as we explicitly do, that we should attempt to compass too much, were we to allow our treatment of the subject to range over the wide field of comparison between ourselves and other peoples. Therefore, as our purpose relates particularly to our own country, with which, as dermatologist and traveler, we may claim without immodesty to be quite familiar, we shall confine ourselves chiefly to remarks regarding it, with the preliminary understanding that there is no intention to speak to its disparagement in comparison with other countries. This ought to be evident from what has already been said, but that it may not be left in the least doubt, we add our conviction that in proportion to the population, among all the peoples of the earth, there are none, except the Japanese, so cleanly as are generally the native-born people of this country. When, as a physician, we here preach the social and hygienic obligation of the bath, it is because we deem that general recognition of its salubrity has not yet reached the point which our national prosperity and culture in other respects seem clearly to indicate, if we would regard ourselves in that particular equal in civilization to the ancient Greek and Roman.

It will doubtless be shocking to many, to whom the most assiduous care of the person is habitual, to learn that there actually are persons who pass through life without ever having had the body wholly immersed in water. We once received from a girl of the humbler classes the confession that she had never had a bath of immersion, nor knew of any of her companions who

had been so blessed. It was evident, however, that she and they craved the boon from which unkind fortune had debarred them from the realization, and they were to be commiserated. Individuals of even the lowest type seek on occasions the solace of the bath. Some years ago we witnessed on the small-pox quarantine island, in the harbor of New York, the bathing of some emigrants of that type, there detained upon suspicion of possible contagion to the city. Poor, ill-clad, and unkempt creatures, who had been mewed up in crowded quarters aboard ship, they fully enjoyed the luxury of that hot day's refreshment. That very class of emigrants, however, once fairly landed, away from the close contamination of shipboard in reeking steerage quarters, easily recognizable at any time among our population by their elf-locks and dirty appearance, resumes its habitual holy horror of pure water.

It must not be imagined, however, that the indigent and unfortunate of mankind alone are those who are invariably squeamish about the use of water. There are persons in contact with the highest culture, who, through lack of early instruction, or innate indifference, seem to be possessed with almost an aversion to it. We knew a case where a family of condition and means came to visit another which, down to its smallest member, was devoted to water, and betrayed through their abstinence in the midst of exceptionally lavish resources for bathing, habits of life of an entirely different cast. As we intimated at the beginning, the multitude bathe for enjoyment of one kind or another, in swimming or breasting the breakers or relief from heat, but only the refined for the pure and simple satisfaction of perfect cleanliness. It is perhaps for this reason that it is ordained that the rain shall be sent equally upon the just and the unjust, that all men may be sure of getting an occasional wetting.

No criterion whatever is afforded, by the statistics of the

public bathing establishments, as to the relative tendencies of the two sexes to bathe. It will be seen, from those statistics, that the number of men and boys is out of all proportion to the number of women and girls enjoying the benefits of those baths. It is at the same time observable that boys preponderate, that then come men, then girls, and lastly women. These numerical relations of sex and age, and the degree in which they obtain, tally exactly with the relative habits of life among the participants. Boys have a special predilection for swimming, and often have in the summer but two garments to embarrass them, so that their undressing and dressing is almost instantaneous, and they also have a freer foot to please themselves than has any other class in the community, and therefore they are the most numerous and assiduous patrons of the public bath. Men of the laboring class, needing the refreshment, accept the trouble for the sake of the gain of the bath, but, having less opportunity than boys to indulge in it, they are not to be found so numerous there. Young girls are restrained to a certain degree from availing themselves of the public baths by shyness, parental guardianship, and domestic duties. Many women are entirely debarred from making use of them by the demands of domestic duties, and, for the same reason, many others can avail themselves but rarely of the privilege.

We were lately much surprised to see, in an article by a female writer, the statement that women are less fond than men of sousing themselves in plenty of water. The statement is contrary to all experience of which we have ever heard, or have personally acquired, except as it might have some flimsy basis in fact from the false notion of some exceptional women, that water used lavishly upon the face is injurious to the complexion. If sometimes there is any appearance of men being more than women addicted to the use of the bath, it must arise from the

facts just mentioned, and that hitherto, for certain classes, the large Turkish and Russian bathing establishments have not generally included apartments for women. Now that some of these are so doing, it is to be observed that women are availing themselves of the facility. But a barrier will always remain to general acceptance, by women of certain social rank, of baths where they may meet they know not whom, secure neither of the privacy of solitariness nor of that which belongs to entire publicity. This kind of bath, therefore, affords no test as to the proclivity of women as compared with men to the enjoyment of water in lavish quantities. But the private bath does, and in that women indulge more than do men generally, partly because of greater opportunity, and partly because of greater tendency to neatness. The sea-beaches of many parts of the world prove, too, that the women are quite as enthusiastic about bathing as are the men of the same class. In fact, so fond are they of this, the most energetic kind of bathing, that they cannot always be kept within the bounds of prudence as to the frequency or the duration of baths.

It would not be a stretch of imagination to assume, upon the basis of our experience, that girls and women would be just as much given as boys and men are to disporting themselves in *puris naturalibus* in open water, were it not for the prevalence of so many descendants of Peeping Tom of Coventry and the usages of polite society. In primitive places, they sometimes steal away, kindly veiled by the mantle of night, and enjoy a plunge from the free gift of nature. At such an entertainment we once unintentionally assisted, unknown then and forevermore to the bevy of actors in the scene, unless perchance the eyes of one of them should scan these pages.

Arriving near night-fall, by a long stage route, at a quiet hamlet, near which now passes the roaring steam-cars, we supped pleasantly at its only inn, and, lighting our cigar strolled

enjoyably forth into the summer night, committing to chance the direction whither our footsteps should lead. We concluded afterward, upon reflection, that we must have been in a very brown study when we were awakened to our surroundings by a scream and the sound of a splash into a brook bordering our path, followed by the murmur of female voices in alarmed consultation. The situation did not admit of an instant's doubt, as we dropped with sportsman-like promptness behind some salt-vats which providentially lined the border of the stream. Here, within ear-shot of the whispered colloquy, we had time to determine that our action should be based upon the initiative of the other side. If we were to play *mora* in this fashion, we were determined that the other side should show its hand first. They were at present at the disadvantage of being disrobed, but we were a stranger in town, and on the morrow might be left without a shred of reputation. Most persons, we reasoned, concluding that their unwelcome presence was positively known, would run. We made up our minds that we were not one of those persons. If we should beat a hasty retreat, it would be imputed to having been there with ulterior motive. So we quietly awaited events, merely raising our head over the edge of the salt-vat behind which we were concealed, and commanding a fair view of the scene. We saw clearly the edge of the bank and some bushes near where the bathers were immersed, but nothing more. The increasing loudness of their voices gave us assurance of growing belief that it was a false alarm. At last there was a dead silence. "The cry is still—they come!" In all human difficulties there is a sacrifice, the innocent are offered up, the scape-goat atones for the sins of the people. They did not come, but a girl about 12 years of age quickly emerged over the sharp edge of the bank, and stood about 20 yards away with the most sublime confidence of bearing. Here was an additionally pretty state of things. This was

evidently the chief sceptic as to the belief that any intruder was about. Now, as she gave immediate assurance by gesture and word that they were wrong, suppose they should all swarm up the bank and the discovery be inevitable. The last state of that man would be worse than the first. But, the policy of masterly inactivity never had a more signal triumph. The successful scout regained the water, triumphant shouting began, and crouching behind the line of salt-vats, we raced like a partridge along a furrow back to the hamlet, having made the narrowest escape in our life.

Under other skies, there are other ways not so retiring. In Japan, for example, the bathing of the sexes is promiscuous. There is not a thought of harm in it, so potent is habit in the affairs of mankind. And yet, taken in connection with the high civilization of the Japanese, it has justly been considered the greatest anomaly that enters into modern social relations. But, that the practice which, with the Japanese, has grown into a social habit is not actually contrary to nature, but solely dependent upon social conditions, whether the growth of a country or belonging to inferiority of class, would have been clearly evidenced to us by a single experience that we had, even if every season at some watering-places certain people did not take, in this respect, the fullest liberty that the law allows. At a lonely sea-side summer-resort where business once called us just before the influx of city guests, there arrived, as we sat, solitary and alone on the porch of the little hotel, contemplating an expanse of bay and sea, four light wagons containing as many pairs of young men and girls from a neighboring town. The horses duly cared for, after the exasperating search for the amateur hostler usually employed at such places, the girls took seats upon the porch, and the young men sauntered away toward a salient point about three hundred yards off along the beach where they were lost to sight. Much to our astonishment,

however, soon appeared from the bushes an animated forked radish skipping down the beach to the water's edge, soon followed by three similar apparitions, completing the tale of the male visitors. But were these objects the male visitors, who might, for all we knew to the contrary, be calmly strolling out of sight behind the point? All doubt, however, was set at rest by one of the girls, who exclaimed, "There goes Bill," just as the phrase occurs in "Alice's Adventures in Wonderland." "No it isn't," said another, "it's Bob." "Why, don't I know Bill?" was the rejoinder. "Why, so it is," was the final conclusion,— "There goes John." And there seemed to be no doubt about the rest. These points being settled to the satisfaction of all the parties concerned, I deemed that they ought to be equally satisfactory to me, so, as a philosopher, I meditated on the variability of mankind. Here was a new experience in our own country, of which we thought we had exhausted the experiences.

Enough has been said to disprove any assertion that, as between the sexes, there is any difference as to the instinct of bathing. We feel justified in repeating, in addition, that early training or absence of it makes the chief differences observable in the habit as between different classes of society, that although, as a general rule, refined surroundings in the early part of life tell favorably in the majority of cases, exceptional ones are to be found despite the greatest advantages, and that, with the mass of mankind of both sexes, comfort and pleasure in bathing, not cleanliness, are the chief inducements, the world over, to the practice.

There is one aspect of bathing which, although inferential from what has been outlined with reference to the practice, is so important that it has been reserved for separate consideration. This is its relation to sexual selection. There are many degrees below actual offensiveness of odor, the presence of slight odor, or even the absence of odor, where the degree of neatness may

still fail to attract, and this, again, is far removed from that which positively attracts and charms.

Women sometimes marvel at the attractiveness which the *demi-mondaine* often has for men of the world. "The horrid creatures, what can any decent man see to admire in them?" Well, it is "wondrous pitiful," but the secret is not far to seek. They never cease to try to please. They neglect none of the means of pleasing. They carry neatness of person to perfection. The casket of their riches in influence contains no stronger chain to bind men's souls. It is their business to understand men, and they understand their business. It is a slave-trade which they ply, of which we know not the beginning nor shall ever know the end. It is wondrous pitiful that this should be so. Summon the clergy, advance them to the front with bell, book, and candle, to exorcise the enemy of mankind. But if they would expect to cope with him, let them adopt his hygienic practices.

Instead of the cry of a year or two ago, "Is life worth living?" we have now instead, the inquiry, "Is marriage a failure?" One question is sometimes largely involved in the other. Marriage, as an institution, is certainly not a failure, as our civilization, which is founded upon it, clearly attests. But from causes too numerous to mention here, cases of it may be failures. Even a husband's or wife's relations sometimes make it a failure. Religion sometimes does; contention over property, over the training of children, over personal preferences. But if any one can show us a cause more potent than neglect after marriage of observances which before marriage were constant, we shall be surprised.

After making all due allowance for the fact that in this workaday world two people cannot expect to go on forever junketing, that men must generally return seriously to bread-winning, and women to feminine occupations, a great chasm

possible to be bridged over is often left to yawn in the paths of pleasantness leading to those of peace. Thousands of young men and young women have very little education, no fixed tastes, no ideas, no society. They have exhausted each other's soil of the little that had there grown, and upon marriage they begin to lie fallow to each other for the rest of their lives. The eye, which of the mere senses, longest continues capable of being pleased, ceases to have home resources. The girl who before marriage has often been most attractive by her neatness and plumage, now often put on her fine feathers only to go abroad, while she is the veriest jackdaw indoors. At home she wears frowsy hair and broken-out shoes, because there is no one there to dress for. Her helpmate, who ought to know, does not think that she looks a bit like the girl that he married. He has become equally remiss in his ways. It is true, that as society does not demand of a man that he shall be a thing of beauty, and his daily duties abroad constrain him to some carefulness in dress, he has not quite so high a heaven to descend from as has his partner, and does not. He comes to find "the fellows," a club, a restaurant dinner, more attractive than home.

Neither probably began it. How foolish those conventions are which tell us that the sexes are not capable of equal depravity and equal excellence; that one sex is not fitted for the other, as if they had not been created for each other and molded each other to their liking; that the world would be changed for the better, the best, and bliss, if only women had it all their own way! The common case is simply one of a destiny very rough-hewn indeed, because the judgment was not sharp. To attribute the fault exclusively to one sex, and to exonerate the other, is the fruit of the poorest observation and philosophy. In the first place, the sexes are not involved in the question, save as related to a small minority of individuals of both sexes. When individuals, as representing one or the other or both, either for

cause or no cause, cease to exercise after marriage the attractions which have conducted them to the altar, they cannot in concert meet the trials inseparable from the struggle for existence.

It follows that, whether relatively faulty or not, if women especially, who by instinct, training, and formal profession of their recognition of the elements in which their influence resides, neglect in any way the habitual care of their persons, whether as to cleanliness of skin, neatness of dress, or adornment, they deliberately relinquish their power over men, no matter what the social relations may be between them, for by that act they neglect one of the chief sources of their power, and begin to descend the steps of their throne. Woman herself it was, who, conjointly with man, defined the terms upon which she should share his destiny. A consenting party to the act defining her status, by which she has become all that she now is, she cannot maintain it if neglectful of clearly defined obligations to her willing subjects. A part of her mission on earth is not necessarily to be beautiful, for nature has the final word to say as to that, but to be as attractive as nature will permit. The worldly wisdom of the unscrupulous class, to which we alluded not long since, smiles contemptuously at the frequent blindness of good women to the silken strand by which the liking and affection of some men may be securely held.

One may be very certain, we repeat, that with the multitude, the comfort and pleasure of the bath are the chief incentives, the world over, to the practice of bathing. Therefore it is that it is so desirable to inculcate the practice in early youth, that it may become the habit of life. Given the heat of summer, the suffering that always and the sleeplessness that sometimes ensue, and few there are who do not gladly bathe. In fact, the wish to bathe, under these circumstances, is truly instinctive. But we looking at the matter as a physician, know that, for

health and beauty, bathing is necessary at all seasons of the year, if practiced according to rules that are perfectly well established, recognizing all conditions present,—temperament, age, state of health, digestion completed, the temperature of the air where the bath is taken, and the temperature of the water.

The promiscuous bathing of the Romans did not take place until the time of the decadence of the empire, and even then did not involve the matrons and daughters of the higher ranks of the people. The change was one of the notes of the depravity of the times, being a new departure in manners involving morals. Not so, however, is it with the Japanese. All travelers are agreed that, with them, up to the very present time, when they are assimilating themselves more and more to European ways, the government discountenancing the continuance of the practice of the promiscuous bathing of the sexes, it had no relation whatever to morals. Even so late an observer as Mr. La Farge, the artist, indicates this in one of his articles on Japan, where he, incidentally to describing his arrival at the town of Utsunomiya, and taking a refreshing bath after a hot day's journey, says that he saw "a whole family, father, mother, children, file down to the big bath-room at the corner, whose windows were open to mine. I heard them romp and splash, and saw their naked arms shining through the steam. Meditating upon the differences which make propriety in different places, I joined my friends at dinner and listened to what the doctor had to say upon the Japanese indifference to nudity; how Japanese morals are not affected by the simplicity of their costume. . . . Then came the question whether this be a reminiscence of Polynesian ancestry and simplicity, or born of climate and cleanliness. And, indeed, all Japan spends most of its time washing, so that the very runners bathe more times a day than our fine ladies." By day-dawn Mr. La Farge was awakened by the various noises of the courtyard, in front of his window. "Our

Japanese family," he says, "I could hear at their ablutions." And in the course of the day's journey toward the mountains he saw Japanese runners washing by pouring pailfuls of water over each other.

So it is in Japan; bathe, bathe, wash, wash, all the time, from morning until night. No one who has ever witnessed it ever thinks the various processes anything but beneficial to the skin. The scarf-skin, being albuminous, is slightly thinned by the use upon it of water and the alkali which goes to the formation of soap. Even by friction with water alone, it becomes more and more constantly renewed by the layers beneath it. It becomes, by combined ablution and friction, soft, pliant, and finer than satin in the appearance of its texture. Besides this, bathing has upon the corium, or true skin, a revitalizing influence, and thence upon the general system, and thence, by reaction, upon itself. Combined with the proper kinds of soaps, avoiding the irritating ones, bathing removes from the skin all effete oily products, scarf-skin scales, crusts, and everything that may impede the performance of its natural functions, or afford a lodgment to disease.

To give the reader an idea of how far below the civilization of the Japanese many Americans are in these matters, we will take no extreme case by way of illustration, but that of a very respectable man in a distant State, who once freely expressed to us his views on the subject, without the slightest suspicion of how woefully ignorant he was about it. He decided that it is wrong to bathe a baby every day, lest something may be removed that nature had intended for the protection of the skin. That was the way in which he expressed his objection. We gathered from his reply to our question as to what was the nature of the substance to which he alluded, that he meant the oil of the skin. Here was a case where knowledge and ignorance were so comfortably wedded, and reliant upon the opinions of preceding

generations, as to make it impossible to shake the conviction ; so we did not attempt the impossible.

It is true, as we have already shown in the chapter on the skin as an organ of the body, that nature secretes and excretes oil for the protection of the skin, even to the point of meeting emergencies, as we had occasion to indicate in the same connection. It is also true that we can use such caustic soaps, or excess of borax, as to remove the oil in quantities so great as to be detrimental to the healthiness of the skin. But there the half-truth which the objector urged ends with the unwisdom of his conclusion. The body may be bathed daily, with the use of the more delicate soaps, with no undue removal of the oil of the skin, and with perfect maintenance of its fine condition. Nature does not cease to yield its store of lubricating material because the scarf-skin is kept cleansed. But the oil, which, having performed its purpose, remains on the surface of the skin in a degraded form, clogging the pores and preventing the freest issue of the effete products of the body, requires the combined deterrent influence of pure water and good soap for its removal, and should have them. From its pure source of supply wells up, as nature requires it, whatever the skin in health demands for its best condition. Can any one imagine, and yet this objector must have done so, that any skin can be fragrant if the oily product of the sebaceous glands be retained upon it? Much more probable is it, however, that he had never seen a thoroughly well-conditioned baby, or, if he had, that his sensibility was not acute enough to detect the difference between it and one of the kind to which he had been accustomed. It is the very best practice, adopting the precautions of a warm room and tepid water, a short immersion, a brisk towelling, and quick dressing, to bathe an infant every morning of its life, when it is well, just before it takes its second meal of milk or other food for the day. Only upon these terms can it be perfectly healthy and sweet in

person, and it will be, if healthy, fragrant as a rose. If, as is true, this delicate creature is by constant bathing benefited, its vitality increased, its greatest immunity from disease secured, the process is one which cannot harm, but must improve the physical condition of any grosser being. And so we find, where there is knowledge of its efficacy, the process applied equally to relieving a lowered tone of the system, and to the increase and maintenance of great vitality and strength.

CHAPTER XVI.

BATHING AS PRACTICED IN ANCIENT AND MODERN TIMES.

A FULL account of bathing as now practiced, independent of the history of bathing in ancient and modern times, would in itself fill a volume. We are therefore confined to such general and special considerations, in both branches of the subject, as may be treated of within moderate limits.

Bathing may be regarded as divisible into four kinds, as determined by the motives prompting and the objects sought to be accomplished by the practice. These are, for recreation and comfort; for cleanliness in the interest of general health and agreeableness; for increasing vigor and beauty of person; and, lastly, for medical treatment.

As to the last object, it is to be remarked that, only very recently has the regular medical profession accorded any large measure of acceptance to hydropathic treatment in disease. Hydropathy, so-called, for a long period, and even yet in some degree associated with a visionary pathology, which fitted treatment to nearly all the ills which flesh is heir to, generally repelled regular physicians. A similar consequence ensued from a similar cause in the case of electropathy. The beginning and end of the affair in both cases are not anomalous. From the times of Hippocrates, Aristotle, and Galen, down to the present era, the main body of physicians found to its hand, or had proffered to it by the laity or some of their own brethren, procedures which it, as a wisely conservative body of men, was not willing at a moment's notice to accept. The duty of such men, besides being pioneers in discovery, is to prove all things and hold fast only that which is good.

The day has now arrived when the regular profession will

accept hydropathy and electropathy within due limitations. Under the names of hydro-therapy and electro-therapy, the most advanced physicians of the day now frankly accept in them whatever facts have been ascertained as to both, regardless of their source, and have themselves made greater strides in discovery in the department of electro-therapy than can be discerned in its history during the whole period there of the reign of quackery. It is most natural that this should ever be the tenor of events, since physicians work from the basis of sound pathology, unmodified to suit the exigencies of any special treatment, and upon that of a fund of the greatest general scientific knowledge of the day.

But here, with this brief mention of the present status of hydropathic treatment, a word as to which could hardly be omitted in an account of the application of water to the surface of the human body, we dismiss the topic as only indirectly connected with the subject of this work. Hydro-therapy relates to the cure of disease by means of water, whereas bathing relates to the maintenance and increase of health. One point, however, within hydro-therapeutic treatment should be mentioned in conclusion, as not unduly trenching on our necessarily assigned limits, because it should be known in every household. This is as to the calming effect of the tepid bath. Knowledge of the fact can be utilized for many home purposes. So sedative to the nervous system is the tepid bath, that, in a properly-heated atmosphere, children taken screaming from their beds, in a paroxysm of colic, and, plunged into it, have been instantly and permanently relieved of pain.

With the permission of the reader, we will begin our description of bathing facilities with those of the ordinary city appliances for household bathing. These, at their minimum, are a good-sized metal-lined tub, with a sloping back,—all good features of the construction. The only household addition to

this is the cold and warm shower-bath,—a very useful appliance if not abused. Cold shower-baths should be taken with strict reference to the capacity of reaction in the individual bather. We have known persons to come blue-lipped from a five-minute immersion in the ocean. Some delicate constitutions cannot bear the combined salt- and cold-water stimulation. So, also, there are some persons who cannot bear cold fresh water, whether in quiet contact with, or falling in a shower upon, the body. The supreme test of whether good is being done has back of it the opinion of all the physicians of the world. It is contained in the answer to the question, Is there a good reaction? A good reaction is that in which, when the skin is rubbed vigorously with a towel, the blood freely rushes to the surface. If, upon being rubbed, the surface becomes instantly red and tingling, there is the most beneficial effect; if not, not. Injury lies on one side of the line, benefit on the other. To some persons health may lie on one side of the line and death on the other. All the persons whom we have known who boasted of breaking a film of ice to take their morning baths have died early. As was declared in ancient times of oratory, that it depends upon action, action, action, we say, of good to be derived from bathing, that it depends upon reaction, reaction, reaction. The towels used should be rough as to their surface. Huckaback toweling is good, and Turkish best of all.

It is important that a bath-tub should be lined with what becomes readily heated by conduction, and can easily be cleansed. Beauty should be the last consideration in its construction. The justification of a bath-tub's being is first use and then beauty. Use prescribes avoidance, for a bath-tub, of a material whose specific heat is low. The most beautiful tubs for bathing that we ever saw were in the St. Charles Hotel, in New Orleans. They were made of Carrara marble, and handsomely sculptured outside. But stone does not conduct heat well, and its specific

heat is low. It is not agreeable to have one's bare back supported by marble.

There is a rage now for tile bath-tubs. Tiles have their decorative uses, but not legitimately for bath-tubs. Their specific heat is not so low, nor their power of conducting heat so poor, if we mistake not, as those conditions are in marble; nevertheless, for the same and other reasons, one of which is that they cannot, at the tile junctions, be kept so clean, they do not make proper bath-tubs, and whatever does not naturally fit a purpose cannot be handsome as applied to that purpose, whatever may be its intrinsic beauty.

A porcelain lining conducts heat well. Its cleanliness for a bath is a great charm. A porcelain bath-tub is, however, quite expensive as compared with the ordinary kind. Celluloid could be adapted to the same purpose. But we confess that, if we were a millionaire, we should have a silver-lined bath-tub. Silver is an extraordinary conductor of heat, as any one can determine for himself, if he will put a teaspoon into a cup of hot tea, and soon feel the top of its handle. In the open air silver does not tarnish at all. In house air it tarnishes only slightly, from the presence there of a trace of sulphuretted hydrogen. If a tub lined with it were wiped out daily, as all bath-tubs should be, the film of sulphide of silver would be inappreciable to the sight. On the other hand, the silver surface, as silver is susceptible to the smallest trace of sulphuretted hydrogen, would make a superlative test for normal house purity of air in the bath-room, which in so many modern houses is associated with a water-closet.

The only additional appliance which we could suggest for household bathing, for the case of handsomely-appointed dwellings, would be one enabling a person to take a pure-vapor or a medicated-vapor bath. Only a very small amount of room is necessary for the purpose. A suitable device for it will be

described later, under the head of Turkish and Russian baths. In a household, such a device would prove most convenient upon many occasions. Violent colds can be reduced with the utmost certainty by a vapor bath, if followed by the warm wrapping up of the person in bed. Cutaneous disorders are often excellently treated by sulphur and other medicated baths.

There are soaps and soaps; some good, some bad. Sometimes the cost that should have entered into them to secure goodness has gone too largely into advertising. Lubin's we regard as the best toilet-soap in the world. But it is too expensive to be used for bathing purposes by persons of ordinary means. For the face and hands, however, if used economically, not allowed to waste by lying in water, it cannot be regarded as uneconomical. Pears's soap is good, but by no means the wonderful creation represented, the beauty of the most lovely of professional beauties depending upon it. There is nothing better than pure castile-soap for general washing purposes,—real castile-soap. If one can get pure-white castile-soap, one cannot do better for healthy application to the skin. It is always sought for in its purest form for the skin of infants.

The public seems to imagine that there is something mysterious in the production of soap. They seem to regard every new, well-advertised soap as an essentially novel discovery of some highly-gifted inventor. As a matter of fact, the best qualities of soap are rather negative than positive. Soap is simply a deterative or cleansing compound, which acts, in combination with water and the oily products of the skin, in forming an emulsion, which the mass of water constituting the bath readily dissolves, carrying with it the whole of the effete sweat and sebaceous products of the skin, scales of scarf-skin, and extraneous dirt. That combination, therefore, which best represents the ingredients of soap in their greatest purity makes the best soap. Through such qualities one is enabled to cleanse the

skin with the most pleasantly soothing application adapted to its needs. .

Soaps being made simply of an alkali and oil, and additionally sometimes scented, it follows that, the finer the alkali, the oil, and the perfume, the finer will be the soap. The differences in the qualities of these substances is immense. Our knowledge in such matters is far beyond that of the ancients, and even that of our immediate ancestors. The Greeks and Romans had no true soaps, the substitutes used for them being oils and ointments and the flour of lentils. The civet-scented beau of even a couple of centuries ago would not be more welcome in society now than would be the presence of a billy-goat.

We remember that, as a boy, we read a book on foreign travel, intended in places to be funny, but funny only in an account of how the writer, as bathed in Turkey, had had every joint in his body cracked in succession, the performance closing with a painful attempt on his backbone. There are baths where the process also includes being switched. We determined that we would be switched rather than that anybody should try to crack our backbone. In fact, we were so sure of our anatomical make-up, that we were confident that if anybody should succeed in cracking our backbone, there would be no object in proceeding. But, shortly afterward, when we were grown-up, the work of Dr. Erasmus Wilson, than whom we do not know of a higher authority on bathing and cognate matters, destroyed our theory of the impracticability of cracking backbones, by quoting a trustworthy witness of the performance. However, he was not referring to our backbone. We have resolved to draw the line of cracking bones at that point. There we should stand to fight, unless it were attempted by such a person as one of whom we had experience in the Swedish-Movement Cure. Wishing to investigate the merits of that system, we once presented ourselves at an establishment where it was prac-

ticed, and were received by a little man, who placed us on a table and performed various antics with us. At last he mounted upon the table, and partly upon our shoulders, remarking that the system prescribed, among its movements, resistance to the muscular force of the operator. The absurdity of the performance reached its climax when we found him perched like a sparrow on our shoulders, trying in vain to force them one way or another, calling upon us to resist. "Resist," quotha! Why, there was nothing to resist that the *vis inertiae* did not amply suffice to overcome. That is the only kind of person that we don't object to for cracking our backbone. We, therefore, upon second thoughts, draw the line there, instead of objecting to the mere abstract cracking of it.

If, in our American so-called Turkish and so-called Russian baths, they do not attempt to crack our backbones, they certainly do try our patience. In them, "every prospect pleases, and only man is vile." Instead of their having thoroughly trained attendants, who understand what they profess to know, and who are aware that they do not understand what they cannot possibly know, we find indifferent shampooers with astonishing knowledge of the therapeutic value of the just sequence of bathing processes, of heat and time and all things else adapted to suit every different organization and special need. All that our baths require to make them excellent is skillful shampooers who know and mind their business. Turkish shampooers would make them perfect, for we have the water, the heat, the vapor, the toweling, the soap, the coffee, the segars, the mineral waters, all the requisites for enjoyment but the presence of skillful masseurs who do not presume to think, but merely know their trade. A Turkish or a Russian bath without skillful shampooing puts one in the position of the Peri at the gates of Paradise, without the final bliss; for, after all, besides the delicious end of securing perfect cleanliness, the luxury of the

bath consists in its entire abandonment to the sensuous enjoyment of absolute rest in re-created being. All pleasurable sentiments blend in the delight of perfect cleanliness, vaporous languor, gentle somnolence, dry warmth, revivifying freshness, and renewed life as the final magic touch. The whole world and his wife stands aloof for a while. Dark care may ever sit behind the horseman elsewhere, but he does not join one in a Turkish or a Russian bath, at least for an hour or two, by which time one has had his coffee and segar, and is ready to meet and defy him. Then, why should we not have skilled shampooers to make perfect this great boon of the bath? Why not send for heathen Turks to instruct us, and willingly pay their port-dues, and let them shampoo us skillfully and crack our Christian joints, even to the backbones of those who like it?

One improvement we should recommend in the baths themselves. It is that to which we referred a few pages back, in connection with the statement that it would be applicable to highly-appointed dwellings. According to our judgment, the inhalation of vapor in the ordinary Russian bath forms no part of its hygienic, and certainly none of its deterrent value, and often has objectionable features for the special object in view. Yet only in the city of San Francisco did we ever see a construction for administering the vapor bath, such as to admit of having the head free of vapor. A friend, however, informs us that he has seen a similar one in Detroit. The appliance that we saw and used in San Francisco was of the simplest construction. It consisted of a box of a little less height than that of a person seated. This is vertical on its sides and back, and closed with folding-doors in front, which slant back at such an angle as to leave, with the top of its back, just space enough to accommodate the neck. After the entrance of the bather, and the shutting of the folding-doors when he is seated, the rectangular slit thus left open at the top of the box is closed by two short pieces of plank

cut out semicircularly at the ends so as to close around the neck. The bath-attendant then inserts a towel gently around the neck, so as to prevent the egress there of the vapor from the box, and the bather is ready to turn on the vapor from a faucet conveniently placed near his hand. He is entirely inclosed without being fastened in the box. There he can sit pleasantly for half an hour, adjusting through his sensations the heat of the vapor, and feeling the condensed cloud trickle down in great drops from his person. When sated with the enjoyment, he summons the attendant and is well washed off under a properly-tempered shower-bath, is rubbed down, packed in blankets, and readily falls asleep for a few minutes, awakening wonderfully refreshed. Thus can be given plain-vapor or medicated-vapor baths, and the method is represented by an appliance which certainly could easily be added to bathing facilities of private houses of the highest class.

We must not, in the interest of persons who have never seen one of our American Turkish and Russian bathing establishments, omit some description of them. They consist of various apartments devoted to different purposes. In the reception-room the visitor commits his valuables to the attendant there and receives a check for them in return. He then undresses in an alcove devoted to his exclusive use, and curtained from the apartment in which it is situated. Emerging thence, with a towel for kilt, he goes to the hot rooms, which are generally two, sometimes three in number, following each other in a sequence of gradually increasing temperature. The last room is frequently so hot that it is avoided by the bather. The temperature there frequently reaches 200° Fah., which is certainly too high for persons liable to congestion of the lungs or those predisposed to apoplexy. Having induced a profuse perspiration, by subjecting the body to a high temperature, the bather now puts himself into the hands of the shampooer, who places him horizontally on a

marble slab, and soaps and shampoos him. He is then rinsed off under a shower-bath, and may incidentally go into a room densely filled with hot vapor, immersion in which forms the chief characteristic of the Russian bath. Thence some persons who are swimmers dash into the swimming pool, which among the Romans was called the piscina, or fish-pond. For our own part, we confess that, although loving a plunge in the river or the sea, the preliminaries which have been described impart to us a certain agreeable temporary lassitude averse to any active exertion. Then, too, there is all the difference in the world between the suggestion of water sparkling in sea or river, and that seen in the dark pool of a bathing establishment illuminated by faint natural or artificial light, and black and dreary-looking as in a cave. It is at this stage of the proceedings that the ordinary bath-attendant is most annoying. He is certain that you need a plunge; it will do you good. But we resemble an old Quaker friend of ours, who once said in our presence that he generally knew what he liked. Both causes mentioned doubtless conspire to make us omit the plunge and betake ourselves to the crypt where one is duly rubbed down until a pleasant glow is generated all over the body. Thence one proceeds to a moderately warm apartment, where, reclined on an easy lounge, he sips his coffee and smokes a segar, if he is wise, and after that dresses himself quietly, feeling, as he leaves the portals of the bath, that he has not left hope behind except to come back again, and ready to meet the world and find life worth living.

Besides the effect produced upon the skin, and through it upon the nervous system and general organization, by water simply as a vehicle of temperature (cold water causing combustion of fatty tissue and lessening the weight, and hot air and vapor promoting perspiration and lessening the weight), there are other effects due to its application to the surface of the body. The force of the impact of water falling on the skin has

a stimulating effect upon the general nervous system. Water, too, as well as other fluids, can enter the system through the skin, that integument being slightly hygroscopic; that is, having an affinity to moisture. It is true that the capacity of the healthy skin to absorb moisture is small, owing to the existence of its horny layer. But that the capacity does exist in some measure has been amply proved. Any one will observe that, after lying in a warm bath for some time, the nails become pliant and the skin macerated, so to speak, to a certain degree. It is especially owing to this belief that milk baths have sometimes been taken, with a view of imparting softness and beauty to the skin. We have heard of such Sybaritic practice in one case lately, but the most famous instance on record is that of a French lady, who, about the time of the French Revolution, indulged in a daily milk bath, and afterward had the milk sold. Perhaps that was her way of looking at Liberty, Equality, and Fraternity, or as Mr. Jefferson jokingly phrases the sentiment in his autobiography, when speaking of theatrical squabbles in his early youth, "Let's all be equal, and I'll be king," for the lady to whom we have alluded certainly had the cream of the thing.

That the skin does not readily absorb fluids is proved by an electrical experiment that a friend of ours lately tried. It is well known that fluids in closed tubes move in correspondence with the galvanic current, and some persons have gone so far as to say that they have proved that fluids can be driven by this instrumentality through the body. It was to test the truth of this statement that our friend took starch and iodine, which in moist contact produce a beautiful blue tint, and placing them, properly dissolved, on opposite sides of the hand, satisfied himself that, if there were any penetration of the skin by the substances, such portions as entered must become at once absorbed, for on neither side of the hand was the well-known blue tint produced which follows the contact of starch and iodine. At

the same time, it must not be inferred that such a fluid as warm milk would not penetrate to a considerable amount over so large a surface as that afforded by the body, for, in fact, drink can be imbibed and thirst quenched or alleviated by this process, and milk or other liquid food be sufficiently absorbed to nourish the body. All that we say is, that the skin, on account of the presence of its horny layer, is not highly absorbent. The mucous membrane, on the contrary, is highly absorbent, as many facts in medicine and surgery attest.

It thus becomes apparent why medicated baths, such as sulphur, may prove beneficial in certain cutaneous diseases, and also why it is highly probable that for skin impoverishment, in consequence of disease or old age, a bath of milk or other emollient fluid would have a renovating effect upon it. Shrunken, wrinkled skin indicates a condition of progressive atrophy, represented otherwise by a number of associated changes in its structure, in sum representing lowered vitality in the whole body. These associated changes are lessened vascular and nerve supply, and consequent absorption of parts, particularly of the fatty portions of the subcutaneous connective-tissue.

Sand baths, readily obtainable on the sea-shore, and from time immemorial indulged in by children for sport, are very beneficial for rheumatism and some other ailments. As, however, sand consists chiefly of pellicles of siliceous or flint, including comparatively little vegetable matter, the benefit occasionally received from a sand bath must be chiefly derived from its constituting a slightly moist pack, excluding the air, the effect of which is to promote copious exudation from the skin. Wet soils, on the contrary, found near mineral springs, sometimes efficacious in the treatment of cutaneous disorders, are, of course, composed in varying proportions of vegetable and mineral substances more or less in solution. These, in sum, represent chemical combinations that are frequently beneficial to

the skin when diseased. In the legend of the rather mythical Prince Bladud, who is supposed to have first appreciated the medicinal virtues of the mineral springs of Bath, England, although, according to the legend, it was his wallowing swine that first expressed their approval of the spot, we find evidence that, at a very remote period, the curative qualities of moist earth were known. The belief has, indeed, been traditional, with varying degrees of information, from that of medical and surgical knowledge of the antiseptic adaptability of clay in treating certain malignant conditions, down to that which goes no further than the boy's record of the fact that moist clay relieves the inflammation from a wasp's sting. We ourselves have always remained under the strong impression that Christ, in anointing the blind man's eyes with moistened clay, did not perform a meaningless ceremony, but thereby recognized the existence of an inherent curative virtue, perhaps perfectly well known to the Jews.

A very pleasant, and, on occasions, useful electric bath can be self-administered by any one who possesses a small faradaic battery, which costs only five or six dollars. Lying immersed in a warm bath, the battery-poles passed over the edge of the tub, the bather can apply them with ease to any portion of the body: Constipation is readily relieved by this process, the best mode of administering the current for the purpose being to keep one sponge-covered pole stationary on the body, while the other is passed over the belly in a curve beginning on the right, then going upward, then across, then downward, and so on in the same manner, thus following the course of the ascending and descending colon.

Written records speak of bathing among various peoples of antiquity,—Egyptians, Hindoos, Persians, Jews, Greeks, and Romans. Those relating to the practice among the Greeks and Romans are naturally the fullest, and, of these, those concerning

the Romans transcend in importance those concerning the Greeks, the difference between them, as representing the high development of the practice, being probably otherwise well indicated by the fact of the absence of ruins of great Greek bathing establishments, contrasted with that of the existence of Roman buildings for the same purpose, whose magnificent ruins attest the prodigality of wealth and art lavished on them for the sake of the healthfulness, enjoyment, and refinement of bathing.

In the early times of Rome, when she was at the zenith of her military glory, and art and refinement of all sorts were undeveloped, of course bathing mostly took place in open streams, or in the ocean. Upon the basis of this fact we find Shakespeare representing Cæsar as swimming with Cassius in the Tiber, and crying out to him, "Help me, Cassius, or I sink." Two hundred years, however, before his time there were swimming-pools in Rome. Claudius—not the Emperor Claudius, who lived at the beginning of the Christian era, and finished the two most splendid aqueducts of Rome, begun by Caligula; but the censor, Appius Claudius, who was born three hundred years before the emperor—constructed the first aqueduct leading into Rome, although the one built forty years afterward was always known as the old aqueduct. This was what led immediately to the establishment in Rome of the *piscinæ*, literally fish-ponds, but technically cold-water swimming-pools.

Public bathing establishments sprang up in Rome immediately upon the introduction by Claudius of water into the city from Præneste. They were, however, during the Republic, comparatively poor establishments, called simply *balneæ*, or baths. It was not until the time of the Empire that the institution of the bath flourished. The baths then became *thermæ*, or warm baths, although they contained facilities for both cold and warm bathing, and some persons frequented them for cold bathing alone. There were also private baths, and great patricians had

them attached to their villas. Not Rome alone, but other Italian cities, adopted the institution. Successive emperors vied with each other in providing them for the people, erecting for the purpose buildings of stupendous size. These sometimes contained halls supported by magnificent columns, lined with precious marbles, and adorned with fine mosaics and statuary. Theatres, libraries, and places for athletic sports were sometimes included in the same pile that afforded beautiful colonnades open to interior blooming courts, provided with seats, where philosophers or men of affairs could rest or stroll about at pleasure.

In the Roman bath of the most sumptuous kind there was the apartment in which the bather disrobed; the tepid apartment, that in which the body was sprinkled to remove perspiration; the apartment in which hot-air and hot-vapor baths could be taken, where there was a warm bath; and the cool apartment, in which was the swimming-pool. This pool, in the baths of Diocletian, was 200 feet in length and 100 in width. The Mohammedans long subsequently adopted this kind of bath from the Romans, and through them it spread into Spain and various other countries. The reader may remember that, in the "Arabian Nights," Aladdin first sees the Princess Balroubadour as she goes attended to the bath.

The process of bathing in the Roman *thermæ* was like that with which we are acquainted in our similar baths, except, as already mentioned, that some persons took only the cold bath of the swimming-pool. The Romans, however, did not possess soap, and used the *strigil*, or sharp scraper of bone, ivory, or metal, for the same purpose for which we use the much better adapted flesh-brush or flesh-glove. As compared with us, however, they more than made up for these disadvantages by the frequency of their bathing. The most magnificent of their baths were those of Agrippa, Nero, Titus Domitian, Commodus, Caracalla, Diocletian, and Constantine.

If demagogism in Rome sometimes degraded the people by giving them magnificent bribes for their liberty, in the case of the baths good certainly came out of evil. Demagogueism is not yet dead in the world, but unselfish generosity was never so much alive to the good of the people as in the present era. It is not too much to say that it could not have a worthier task than the institution of public baths for all seasons of the year, scattered at proper intervals over the area of our great cities,—such baths as London and even little Glasgow can now boast, in connection with which the best laundry facilities can be procured for a trifle by the poorest women. A philanthropist who should, at the present stage of our civilization, supply this need of cleanliness, and additionally, in the form involving the healthful exercise of swimming, would do more for the souls of the people than his expenditure of an equal amount for any other good purpose could accomplish. The gift would yield in return wide-spread increase of health and comfort, and afford legitimate vent to pent-up nervous energies, which, in the life of a large city, are somewhere always verging upon dangerous explosion.

CHAPTER XVII.

THE CLEANSING OF THE FACE.

IT may, without due reflection, seem to some persons preposterous that any one should need instructions as to the care of the face. But experience shows that there is nothing which has not escaped the observation or the opportunities of learning of some people. In ancient Rome people were taught to chew and otherwise eat properly,—a line of instruction which would not be amiss at present, if many only knew their deficiency in the matter. We have seen in the course of our travels instances of disgusting eating, the most egregious of which was at a respectable hotel, where a man, with a bib made out of his napkin, dripped soup over it from the eaves of a huge untrimmed moustache, which he occasionally combed out with his fork. We occasionally see girls, tricked out in the height of the fashion, affectedly laugh so as to let one see down their throats. Yet eating and laughing are two natural movements in which superficial observers suppose that no human being can possibly need instruction.

In the first place, in regard to the proper care of the face, it is to be observed that no beauty of it can be based upon anything short of the healthfulness of its skin, and that no healthfulness of its skin can be secured by face-powders or face-lotions, or anything short of the deterative effects of good soap and water and mild friction. Simple, however, as this statement is, it needs amplification to make sure of no misconception arising from it. If one were to wash the face and hands in very warm or in hot water, and then expose them to cold air, both would become red, roughened, chapped, and coarse, as we see every day, in an exaggerated form, in the effects produced on the hands of servant-

girls who wash outdoors with a bucketful of steaming-hot water, with the temperature of the air at or below the freezing-point. If, on the contrary, the temperature of the room in which the face and hands are to be washed is high, and there is to be no exposure of them for some time to the cold air, one can wash them with impunity in warm or even in hot water. With impunity, we say, but not preferably, for very warm or hot water has not upon the skin the desirable tonic effect of cool water, which tends, through its action upon the nerves and capillaries, to improve it in health and beautify it.

When we wish to remove from the skin some mass of foreign matter, we use warm or hot water, but why? Not because they are as good as cold water for the health of the skin, but because the foreign matter is more soluble in warm or hot water than in cool; because, under the influence of heat, the interstices of the skin where the matter has securest lodgment are expanded; and because the skin itself, being more macerated by warm than by cool water, readily yields up some of the foreign matter with the albumen of the skin itself. In a word, our object is different, when we ordinarily wash, from our object when we are trying to get rid of a mass of adherent foreign matter. The conditions being different, the object becomes different, and, correspondingly, the means to be adopted.

It is only by the use of cool water that we increase the health and beauty of the skin. We use warm water in the bath, but we should not prefer it but for the fact that we should be chilled by the use of cool water in a bath of some duration. If the circumstances were those of nature, enabling us to take exercise in the bath, if we could swim there, we should find the cool bath even more agreeable than the warm,—more tonic, and refreshing. The adoption of warm water instead of cool for the ordinary bath is a very judicious recognition of the fact of the difference between ability and non-ability to keep up the circula-

tion of the blood by exercise. The best bath, therefore, that can be taken under the conditions of house-bathing is one of tepid water, followed by a shower-bath of the same temperature, gradually cooled down to one giving a feeling of decided coldness, followed immediately by a brisk rubbing down with towels. By this means the tonic effect of a river-bath, without the exercise, is obtained with even a greater deterative effect. There is, however, in the exhilarating influence of a bath, accompanied by exercise in the open air, one tonic effect upon the system which is necessarily lost indoors.

Now, the same considerations that cause us to adopt for a bath, when no exercise is taken, a certain degree of warmth, to compensate for the absence of exercise, do not apply at all to surfaces so small as those represented by the face and hands. Hence, for the face and hands we may always avail ourselves of the tonicity of cool water on the skin for promoting their health and beauty. The immediate effect, especially in winter (when the skin as well as the whole body has its winter temperament), of applying warm or hot water to the skin, is to engorge the capillaries and make the parts turgid. The blood being invited, by the expansion of the capillaries through heat, to flow to the surface, without any correspondent reflex tendency being given to it, they for some time afterward remain relaxed, distended, and engorged with blood. Observe the very different action of cool water, and it will be perceived why its application should be followed by a positively tonic effect. The blood moves rapidly in two directions, away from and toward the surface. In this case, therefore, while the parts have not been temporarily altered, their functions have been agreeably stimulated; whereas in the other case the parts have been temporarily altered, and their functions temporarily disturbed. It is readily seen that from one set of conditions the effect must be tonic, and from the other depressant.

There can, therefore, be no question that the proper temperature of water with which to wash the face and hands, if one desires to have a healthy and handsome complexion, is a decidedly cool one. The degree of coolness is to be determined by each one's individual judgment guided by the feelings. Water so cold as to be painful is too cold for the purpose of washing the face and hands, but the determination of what is too cold will depend upon individual differences,—health, habit, sensitiveness of skin. Again, if water is too cold, it makes one hasten to finish the operation, which, at its longest, a short one, nevertheless requires thoroughness in its performance.

No face-powders, lotions, or any cosmetic preparations can impart beauty to the complexion; they can merely cover and leave some film upon it. Many such things fill up the pores and give a pasty look to the skin, leaving their effects in a disorganized tissue. Not so with the cosmetic effect of water, soap, and air, combined with a brisk toweling with a moderately soft towel; not hard, nor soft, nor stiff, nor thin, but with ample absorbent quality and a surface that gives by friction neither the effect of a rasping nor of a smooth surface. Water and soap cleanse, the oxygen of the air gives life to the skin. One who will not let pass from the face what nature declares should go, and prevents entrance to that which nature declares should have free access, presumes to teach the wise mother of mankind what is best for her own children.

There is a belief among women, whether prevalent enough to be considered a popular one we do not know, that soap is not good for the complexion. This is based upon as sound reasoning, if it has any reasoning at all back of it, as is the belief of persons that homœopathic treatment is the best for children and other treatment for adults. The skin does not cease to be the same on the trunk of the body, as it is when the skin of the face. Exactly what is beneficial for the skin elsewhere is beneficial for

the skin of the face. From the fact of the greater exposure of the skin of the face, it is, even when most carefully protected from air and light, not so delicate as the skin of some other parts of the body. Whether or not, therefore, it is proper to wash the face with soap depends entirely upon what kind of soap is procurable with which to wash it. Coarse soaps are undoubtedly injurious to the skin anywhere. But supposing that we are speaking of toilet-soaps of the most elegant kind, or merely of soaps of good constituents, then nothing is so beneficial to the complexion as washing the face with such soaps. An excellent variety is Lubin's almond-soap, the oil of almond itself having a peculiarly happy, emollient effect upon the skin.

Choose soft water, or at least avoid very hard water, and then wash the face as follows: After soaping the hands, pass them gently over the face, well up, with the finger-tips upon the temples and with the thumbs under the chin. Then bending over the basin, wash the face copiously with water, going over it in the round just described. Bending over the basin, with the palms of the hands placed on the cheeks, it will be found that the thumbs are in the position most favorably placed for running them back of and in the interstices generally of the ears. Use them, then, thus, at the conclusion of carrying every double-handful of water to the face, first simultaneously back of both ears, and then around the interior of the ears. While this operation is proceeding, it will be perceived that there are two parts of the ear which the thumbs are not so well adapted to search as are the tips of the fore-fingers. These are the opening into the ear, and the inner part of the fold at the top of the ear. These parts, therefore, should be washed by the insertion of the wet tip of the fore-finger, revolving it gently in the opening, and running it carefully around inside of the fold of the upper part of the ear. A Turkish-toweling wash-rag serves well for washing the ears and back of the neck. Dry the face without violence

from undue severity of friction, aiming merely to give the skin a gentle stimulus incidentally to removing the effete products and dirt which the soap and water have dissolved.

The hand is the best instrument for washing the face. Guided by its exquisite sense of touch, especially in the tips of the fingers, it almost instinctively does its duty in searching out the intricacies of the numerous folds and crevices of the face. When, however, we come to the less intricate and differently placed area of the neck, we find a wash-rag of about eight inches square (made preferably of Turkish toweling) the most convenient thing for washing it, and, if desired, the shoulders. The wash-rag should have a loop on one corner of it, and, after being rinsed out, be hung up to air on the towel-horse or rack for future use.

A very great blemish in the face is sometimes to be observed as a black speck, which can be squeezed out in a form resembling a little white worm. Shakespeare speaks of "a round little worm pricked from the lazy finger of a maid." Whether he meant this kind of a worm or not, which is no worm at all, although it contains in large numbers a microscopic parasite, called *Demodex folliculorum*, we do not know. When such a point is present in an otherwise healthy skin, it is caused by the torpidity of the skin in that particular spot, and is merely a blemish which can easily be removed by gently pressing a watch-key tube placed over the spot, when the matter will exude. When, however, the points are numerous on the skin, they amount to a disease, known as *acne punctata*, which requires medical treatment, both local and constitutional, and all interference with the spots by squeezing and pressing on them leads to inflaming them and intensifying the disease. These black points are the dirty outer ends of plugs of sebaceous matter filling up sebaceous ducts. Unless they are derived, as they are when they amount to a disease, from some profound constitutional disturbance, their pres-

ence suggests need of the hygienic habit of applying good soap and water with gentle friction to the face, and, not to mince matters, means neglect of cleanliness.

In the case of the presence on the face of what are called hirsuties, or development of hair in unusual, and therefore unsightly, positions, there is one sure and painless remedy which leaves eventually no trace of its application, and only for a short time any trace at all. This is the application of the negative current of the galvanic battery, administered with a very fine needle. The needle, being exquisitely fine, does not give a sensation equal to that of the prick of a pin; and the very moderate galvanic current used does not produce much more. The papilla of the hair, which later we shall have occasion to describe, is destroyed by the current, making it impossible for the hair which grew from it ever to be renewed. What are called depilatories, substances for removing the hair, temporarily denude the skin of hair, only to let it renew itself with a more vigorous growth than before, just as the hair is affected by shaving, the length of the individual hair becoming less, but the thickness greater.

CHAPTER XVIII.

THE COSMETIC CARE AND TREATMENT OF THE FACE.

THE face should be shielded from fierce, inclement blasts of cold air, and also from rays of a sun so hot as to blister. Excepting fungi, every living thing requires for health and beauty profuse heat, air, and light, and the skin requires these abundantly, but for beauty within certain fixed bounds. The complexion of an old sea-captain is healthy, but butternut in color, and tough as to integument; yet one may have quite as healthy a skin without those characteristics.

In the case of any blemish on the face, such as is produced by the presence of inappropriate hairs, small moles, or *nævi*, commonly called "mother's marks," they can be easily removed without scarring by means of the electric needle. When they there amount to an aneurism by anastomosis, or intricate blending of blood-vessels, scarring sometimes following their removal, it had better then not be attempted. Elsewhere, even such *nævi* ought to be removed, for, if injured, they often, with increase of years, form an ugly, sloughing sore. On the face, *nævi*, if small and superficial, ought to be removed by the electric needle, and can be, without the result of scarring. Mr. W. Beatty, of London, has lately claimed great success in their removal by the application of arsenic. The preparation employed is the ordinary liquor arsenicalis of the British Pharmacopœia. The *nævus* is painted with it, with a camel's hair pencil, every night and morning, until it ulcerates, a cure being effected in from three to five weeks.

Incidentally, we wish to impress upon the reader that moles and other abnormal skin surfaces sometimes become the seat of papilloma which may degenerate into epithelioma,—a malignant growth. It is, therefore, advisable for every one having such a

growth to watch it carefully, lest, as often happens, some trifling injury to it may cause serious disease. The physician is the proper person to whom to submit the case for treatment. Often these growths need immediate extirpation, which is quickly accomplished by the electric needle.

Sunburn, and freckles, if not of long standing, are quite amenable to treatment with tincture of benzoin and water, one teaspoonful of the tincture to a cupful of cold water. Carefully avoiding getting the mixture into the eyes, bathe the parts for ten minutes morning and night. Let the face then become almost dry after bathing it, and while it is in a slightly moist condition dry it gently with a piece of soft, old linen.

A good preparation for the removal of freckles is the following paste :—

Oxide of zinc,	. . . . .	3 drachms.
Sublimate of bismuth,	. . . . .	½ drachm.
Dextrin,	. . . . .	2½ drachms.
Glycerin,	. . . . .	3 “

Apply the mixture at night, before retiring, and remove the residue in the morning with a little powdered borax and sweet-oil.

The following recipe is useful for chapped lips :—

Quince-seed,	. . . . .	3 drachms.
Water,	. . . . .	½ pint.

When mixed, boil them down to the volume of $\frac{1}{4}$ pint, and then add to the mixture 2 ounces of glycerin, scenting with 2 or 3 drops of oil of roses.

This preparation is good, not only for chapped and cracked lips, but for chapped hands. It also makes a very good dressing for the hair.

The following is a convenient preparation, because it takes a solid form, and can be used in small quantities, as needed :—

French gelatin,	. . . . .	120 grains.
Glycerin,	. . . . .	1½ ounces.
Water,	. . . . .	½ ounce.

To prepare it for molding from these ingredients, cut the gelatin up into little bits, in a wide-mouthed vial, and, after adding to it the $\frac{1}{2}$ fluidounce of water, melt the mixture in a hot-water bath (the receptacle holding the mixture placed in another receptacle containing the water, to which heat is applied). When the mixture is melted, add the glycerin, previously warmed. Then shake the mixture thoroughly up, add to it a drop or two of oil of roses, pour it into molds, and put it away in a cool place until it sets. When removed from the molds, wrap it up in paraffin-paper, such as the confectioners use. In using it, first moisten the skin with water, and then apply it.

We have indicated from the first, that the most cosmetic things in the world for the skin are fresh, cool water, bland soap, and gentle friction, and have expressed our disapproval of artificial modes of beautifying the complexion, or, rather, not of beautifying it, but of concealing it from view. We have carefully pointed out that a wholesome, handsome complexion can come only of the aggregated effects of fresh air, exercise, good food and clothing, and generally good habits of life. At the same time we recognize that there are occasions when one has need of suppressing summarily the glistening of the face from perspiration, and also that, do what we will, there are persons who will not heed our words of wisdom. Recognizing these facts, we philosophically resign ourselves to communicating such information as to safe artificial cosmetics as will include those of which the reader may desire to know.

The following, it will be seen, is composed of very simple ingredients, with whose nature every one is acquainted. It forms a powder for the face, which, if desired of flesh color, can be so tinted by the addition of 3 grains of powdered carmine:—

Prepared chalk,	1 ounce.
Carbonate of magnesia,	$\frac{1}{2}$ "
Pulverized chalk,	$\frac{1}{2}$ "
Scent with rose. For flesh color, add 3 grains of carmine.	

The best rouge of which we know, for fineness of quality and for facility of application, is that contained in Madame Lowenberg's pastilles de Florence. The pastilles are sometimes dissolved in rose-water, and the lotion thus made is applied to the face. This mode of using them produces the vulgar effect of a painted face, which, it need hardly be said, is an effect far from respectable. To avoid this, the pastille should be powdered, a piece of fine flannel dipped into the powder, and the face treated as follows, *à la français*: Pass the flannel gently over the forehead and temples, avoiding the eyebrows, then over the nose, then over the upper lip, then over the chin and around the mouth, omitting throughout to touch the cheeks or the parts under the eyes, the two points which do not need re-inforcing with color, and, if so re-inforced, revealing its presence as being artificial. After having delicately passed the flannel over the parts described, pass over the same parts a soft piece of fine linen. The effect will be far more natural than that produced by powdering the substance on the skin, or smearing it dissolved over the skin, both which modes of using the pastilles, especially the latter, produce a highly unnatural appearance. Flecks of powder that may have fallen on the eyebrows or the eyelashes can be removed with a piece of moistened linen. A brunette uses the pastilles of a creamy-pink tint, and a blonde of a roseate one. For bare neck and shoulders, Lubin's violet powder is a famous preparation.

CHAPTER XIX.

THE HANDS.

NEXT to the face the hand has, of all the members of the body, the most expression. And like all things capable in action, it has expression even in repose. Its physiognomical traits, so to speak, may or may not have been developed by education; they are apparent and significant without it, almost from the beginning, from nature alone. Its range of expression in repose is great, and its range of expression in activity exceeds all but the artist's capacity to depict. Sully used to say that, such was the beauty, grace, and diversity in the hands of a number of figures in a certain foreign painting representing the calling of St. Matthew, he had for his own instruction repeatedly copied them.

Of two pairs of hands of which neither has ever done a stitch of work, a good observer recognizes which are the capable ones. And when we say work, we do not mean mere work, except as special work performed in conformity with the particular quality of brain. If any one choose to consider the fact significant merely as to relative muscular endowment, let him observe beyond, that, independent of the capacity of brute force exhibited by any hand, it reveals the presence of a more or less highly gifted nervous organization. One does not find, even before toil has marred symmetry, elegantly-shaped hands as the possession of a clodhopper, nor such hands as his as the possession of a statesman. Nature is harmonious in her works, from the masses of her sculpture, down to the pettiest details. Pinched nostrils consort with imperfect lungs, as full nostrils consort with fine breathing apparatus. Refinement of organization, without special muscularity, is conjoined with delicacy and

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refinement of traits throughout, and so also the opposite conditions harmoniously prevail. Function is everywhere represented by appropriate structure, down to the big mouth of the orator and the big foot of the pedestrian.

The nervous system dominates the man ; in fact, the nervous system is the man. When we think of the brain as dominating that, we should so think qualifiedly, for the brain is a part of that system. If ever there were a sovereign ruling by consent of the governed, the brain is thus dependent upon its subjects. It rules only upon the condition, not that the body politic, but that the body corporate, shall be sound. It is absolutely dependent upon the well-being of its subjects, from the highest to the lowest. That their fundamental constitution shall not be violated, that their labors shall not be excessive, that they shall have, under law, the right to life, liberty, and the pursuit of happiness, sum themselves up in the ruler's own possibility of pleasurable existence and life itself. The brain, without its prime minister, the spinal cord ; without its cabinet of advisers, the special senses ; the afferent and efferent nerves, without integrity, may make the brain absolutely helpless to have a command executed, or, if affected in some lesser degree, unable to insure any measure of sane rule such as we recognize as emanating from mind.

Thus the brain being informed, prompted, or restrained by every part of the body, and in turn informing and controlling it, dominant only upon condition of its own dependence, prime ruler of the general nervous system only upon condition of the soundness of both, is also harmonized with reference to the mechanical means by which it deals with outside nature, and chiefly as to this by the possession of the hand, a servant characteristic of and by which we may judge of the character of the master. Through the possession of this, the chief mechanical attendant of the mind, man has acquired his present high status

in the animal kingdom. But man is enormously differentiated as to different races and individuals within the confines of the species to which he belongs. With this differentiation, back of which is infinite differentiation in the nervous system, lies corresponding complexity in the character of the hand as well as of other parts of the body. The hand, as the principal mechanical executor of the will, representing the individual brain, the chief daily agent of the nervous system in the struggle for existence, has originally, and by education comes to have still more, affinity with the individual brain, and to present a specific type of expression by which we recognize it in repose or in action as a member determined in character by individual organization.

All that has been said may be condensed thus. Structure and character of function being inseparable, the individual nervous system being everywhere harmonious, and the brain being the chief seat of the system, of which the hand is the principal mechanism, the hand must physically express the general character of the brain as representing character of mind, and we appeal to observation to show that it does. This member of the body, although performing the most menial offices, takes part also on the highest state occasions. Its pudgy contours lie on the mother's breast, characterless until life and experience have given to it traits which they will with time surely impart; but thenceforward it has its life to live, and its joint history with its master or mistress to tell. It wars, or points the moral, turns to love, or in the wildest flights of oratory rises supremely over the scene. It betrays in action or repose the helpless imbecility of a torpid mind, and equally reveals the mental vigor that is latent, not deployed. That it is what it is, the most active physical representative of the personality of every human being, entitles it to a regard and care which it amply repays.

CHAPTER XX.

THE COSMETIC CARE AND TREATMENT OF THE HANDS.

THE hand, being the important member of the body described in the last chapter, every rational being will endeavor to make it presentable. The first of negative qualities in its presentability will, of course, be cleanliness. But, unless doomed by toil to hardness of skin and stiffness of joints, it should have also the positive virtues of gently pronounced muscularity and suppleness, as thus best adapted to the large range of duty which fitness for the plastic and mechanical capacity of mankind demands. And not less are these attributes of the hand æsthetically than they are usefully requisite to its excellence. Its distinctive attributes, of usefulness and beauty, stand on an equal, although on a different, footing. Beauty in it is conditioned upon its appearance of serviceableness; a meagre, undeveloped hand being not more surely incapable of fine action than of presenting any appearance of capacity. Such a hand gives dissatisfaction to the mind from perception of deficiency, which is, in a sense, a deformity. A foot that cannot walk, a hand that cannot act, is a defect, not only from the point of view of usefulness, but from that of beauty. Aurora, although a goddess, the gracious, the glorious, and refined, the rosy-fingered Daughter of the Dawn, does not scorn deftly to draw aside the sable curtains of the night.

It is universally agreed that the handsome hand has tapering fingers, and nails of the form called almond-shaped. We do not remember ever to have seen the fingers too tapering to be graceful, but the almond-shape of the nail is occasionally found in excess. This term, almond-shape, refers to the shape as looked down upon from immediately above the nail. Referring to the

true shape of the nail, as seen from another point of view, side-wise, it should curve slightly from side to side, but scarcely perceptibly from front to rear. When it curves markedly from root to tip it becomes extremely unsightly, and this defect may reach a point in which it amounts to a disease, which will be described in the chapter on the subject of the nails. Reaching that degree of malformation, it presents the appearance of a modified talon. If beyond the smallest degree it curves from root to tip, that formation represents a defect, and the nails should be kept most carefully pared to avoid exaggerating its appearance.

The paper-nail is caused by a congenital defect in the nutrition of the nail-substance. When such nails occur they should be carefully trimmed down to the most restricted dimensions, for when allowed to grow, as we have seen them, with the corners appearing well above the end of the finger, they are not only unsightly, but are liable to be painfully torn. In such cases the advice of a physician should be taken, with the hope that some palliation of the disease may be effected, and the nail be made to assume a more serviceable and more sightly condition.

As we intend to devote a separate chapter to a description of the structure and growth of the nail, which will, of course, apply equally to the nails of the hands and the feet, we shall not here enter more deeply into the subject than to describe in general terms the treatment which the nails, as the most distinguished portion of the hand, require to insure their presentability. Be the shape of the hand and the nails never so handsome, if a person is not especially fastidious as to the nicety of the latter, the hand loses its social position, and damages its owner's reputation for keeping good company; whereas, on the contrary, be the hand never so homely, if it be cared for, the fact will be evident, and it will be recognized as the associate of a gentleman or gentlewoman.

It is by constant, assiduous, not intermittent, attention to the hand that it is kept in proper order. A little box of manicure instruments aid the process, but are merely conveniences with which one can dispense. For the regular routine of the toilette of the hands, one should, in washing them, never fail to press gently back with the towel, as they are being wiped, the delicate selvedge-like edge around the root of the nail. There are little ivory, spade-shaped instruments that are purchasable for this purpose, which come in all manicure boxes. The effect of the nail is wonderfully enhanced by the appearance of the lunula, or little whitish half-moon at its base. When the selvedge-edge is pressed back, it reveals this pretty feature of the part. The edge of the skin, being pressed back when the hands are damp, grows symmetrically, and makes a delicate setting for the nail. Neglected, the nail in growing becomes laden with some of the surrounding skin, covered with whose flakes it presents a most unsightly appearance as it continues to push forward. Some persons are so obtuse to the beauty of this delicate edge of skin at the base of the nail that they actually trim it away, leaving an ugly red rim around the nail, like the edge of an inflamed eyelid.

Of course, all excrescences, such as warts, must be removed from the hand; also such things as agnails, or hangnails, as they are popularly called, ragged pieces of skin caused by the forward growth of the nail. With constant care in keeping the skin at the base of the nail pressed back, these latter, however, do not occur. The most common treatment of warts, with nitrate of silver (lunar caustic), is quite painful, and has to be frequently renewed. A high authority, Kaposi, suggests the following application for their treatment: Paint delicately, with a camel's hair brush, on and around the base of the wart, once daily, with a solution of 1 part of bichloride of mercury to 30 parts of collodion.

Fowler's solution of arsenic, from 1 to 3 minims, twice a day, taken internally, has been known to effect the cure of warts.

Warts can be summarily removed by the action of the electric needle.

There are many refinements connected with the beautification of the hand which some persons would not find it possible to practice. All, however, are able to accept and pursue the following course as the basis of any possible amplification of the process.

Wash the hands frequently with soft water and bland soap, avoiding the use of warm water except for the removal of an exceptional amount of foreign matter on the skin. In wiping the hands, press backward in all directions the skin around the nails. Trim the nails neatly with a sharp penknife (if you can, use the knife instead of the scissors), so that they shall be slightly rounding at the ends, and not project beyond the ends of the fingers. Then round them off to the greatest nicety with the delicate kind of file to be found in the manicure boxes and elsewhere. Daily employment of this filing process enables one even to dispense with paring the nails. Some persons, few we are happy to say, are like Miss Betsy Trotwood, who, being afraid of fire, always went to a hotel in London where they had a marble staircase, and, to secure more marble staircase, took a room at the top of the house. They cherish the nails as if they were exotic plants that ought to show their luxuriance of growth. We have even known a man to have a single pet nail, which was the cherished Joseph of the family of brethren, to the point of having a coat of many colors.

The nails of a Chinaman of exalted rank, grown long to show that he is above the possibility of manual labor, propped up with bamboo sticks, grooved, tawny, friable, are disgusting. In only lesser degree, nails grown distinctly beyond the end of

the finger resemble claws, and, to whatever point the practice is pushed, are to that degree repulsive. Only those nails are handsome which, in themselves handsome by constitution, are constantly changed by new growth, and so pared as to project no farther beyond the end of the finger or the toe than to subserve nature's purpose of protection. Back of a certain kind of beauty there is no utility ; it is an independent existence. Back of a certain other kind, as we have shown, must be demonstrated utility. Without the recognition in practice of this fact, beauty which might exist is often suppressed. It is not we, but nature, that lays down these laws.

Going back to the times of our grandmothers, when things in this country were much more primitive than at present, it was a common thing to find bran upon the washstand, to be used for imparting softness to the skin of the hand. It was employed either in the form of flour or as compounded with soap. It is none the less now a serviceable substance for the purpose named. The flour has, before becoming saturated, a certain moderate roughness, which fits it for polishing, and, after becoming saturated, for an emollient agent, some small amount of which is doubtless absorbed by the skin.

A piece of smooth pumice-stone is well adapted for the removal of any callosities or hard parts on the palm of the hand. Then follows the hygienic treatment with water and bland soap, accompanied, if one please, by the use of bran-flour. Added to this one can very much increase the delicacy and beauty of the skin of the hands by putting upon them, and rubbing well into them, by revolving them within each other, some preparation like the oil of almonds. There was in this country, many years ago, a very elegant preparation of the kind, in the form of a pomade, but inquiry for it lately among pharmacists and perfumers has gone to show that the article is no longer in the market. A speck of this, no bigger than a small pea, well

rubbed into the skin of the hands, imparted to it a sensation of delightful softness and pliability, and to the sense of smell the most pleasant gratification.

If the hands be first of all washed in almond-meal dissolved in warm water, and rubbed when dry with lemon-juice or with Rhenish cologne, and then bathed with the preparation of ben-zoin mentioned in the chapter on the treatment of the face, they are much benefited. We here give the ingredients of a preparation for the same purpose, as compounded by one of the first pharmacutists of Philadelphia :—

AMYGDALINE, OR FLOUR OF ALMONDS.

Best almond-meal,	4 pounds.
Powdered orris-root,	1 pound.
Powdered castile-soap (white),	2 pounds.
Oil of bergamot,	½ ounce.
Oil of bitter almonds,	1 drachm.
Extract of musk,	½ ounce.

Mix thoroughly, sift, and keep in a dry place.

The following recipe for the same purpose is derived from the *Medical Magazine of Pharmacy* :—

ALMOND-MEAL.

Almond-meal, in fine powder, prepared from blanched bitter almonds, after the oil has been extracted,	6 ounces.
Orris-root, in fine powder,	4 “
Wheat-flour,	4 “
White castile-soap, in fine powder,	1 ounce.
Borax, in fine powder,	1 “
Oil of bitter almonds,	10 drops.
Oil of bergamot,	2 drachms.
Tincture of musk,	1 drachm.

Mix thoroughly, and pass the mixture through a fine sieve.

A third recipe for the same purpose is also introduced here, in order that the reader may have some range of selection. It is prepared by the same pharmacist just alluded to, and is especially grateful to the skin when suffering from irritation such as that induced by shaving :—

COCOALINE.

Butter of cocoa,	1/2 ounce.
Oil of fresh, sweet almonds,	1/2 "
Glycerin,	1 "
Finest-powdered, white castile-soap,	1/2 "
Oil of roses,	2 drops.
Oil of neroli,	4 "
Oil of bitter almonds,	5 "
Rose-water, sufficient to make up to	8 ounces.

Make an emulsion.

The following will be found eminently soothing and curative for cases of chapped hands :—

Glycerin,	2 ounces.
Egg-albumen,	2 "
Oil of roses,	2 drops.

Rub the mixture gently into the skin several times a day.

The delicacy and beauty of the skin of the hands may be increased by wearing gloves at night. The mere wearing of gloves under these circumstances has a good effect. This may, however, be much increased by moistening the hands with one or another of the three preparations of almond just given above. The gloves used should be loose, and made of chamois-skin, beaver, or kid. Any such leather gloves, especially such as, from having been worn, are soft and roomy, serve the purpose well.

This process of glove-wearing at night may be made more elaborate. Preparatory to all attempts at refinements, there must be, however, the true basis for refinement already described. If such has been reached, gloves may be worn at night to advantage, in connection with certain preparations which have been devised for the cosmetic treatment of the hands. Supposing that the hands have been duly cared for by the employment of fine pumice-stone on the palms, and that of bland soaps, such as almond, glycerin, lettuce-oil, white castile; the skin of the fingers properly rubbed away from the lunula of the nails, and the nails themselves polished (never scrape them)

with a composition of fine emery-powder and cinnabar, using an instrument such as one finds in the manicure boxes (chamois-skin backed with wood); then the hands are ready for ultimate refinement.

You can use large, soft, leather gloves three or four sizes too large. Rip them open and spread the inside with one of the following preparations. The simplest, and therefore the least troublesome to make, are the three following ones :—

1. Ground barley, the white of an egg, a teaspoonful of glycerin, and 1 ounce of honey.
2. Home-made soft soap, $\frac{1}{2}$ pound.
Olive-oil, 1 gill.
Mutton-tallow, 1 ounce.

After boiling these together, remove them from the fire before adding—

Spirits of wine, 1 gill. .

Ambergris, or some other perfume, to an amount to suit the taste, always being on your guard not to scent things too highly.

3. Refined pine-tar, 1 teaspoonful.
Olive-oil, 1 pint.

Melt in a water-bath, scenting with rose-water or some other perfume.

This is a preparation which does not spoil.

The following two preparations, for use with cosmetic gloves, are slightly more elaborate :—

1. Myrrh, 1 ounce.
Honey, 4 ounces.
Yellow wax, 3 "
Rose-water, 6 "

Melt the wax in a water-bath, and add the myrrh to it while it is hot. After heating them up together, add the honey and rose-water. Beat all up, and add glycerin by the teaspoonful until you secure a paste which will spread nicely.

2. Oil of sweet almonds, 2 teaspoonfuls.
Glycerin, 1 teaspoonful.
Rice-flour, 1 "
Fresh eggs, 2 yolks.
Rose-water, 1 ounce.
Tincture of benzoin, 36 drops.

Beat up until the mixture forms a paste.

Occasionally unsightly white spots appear on the nail-surface. These can generally be removed by the following preparation, put on at night, and the residue removed the next morning with some little oily substance, such as butter, cream, or other things to be found in every household,—some refined pitch, with a little myrrh, and, after mixing them together, lay the mixture over the nails for the night.

There are certain substances so powerful in their action on the root of the nail as to injure its constitution for a long time following frequent contact with them, perhaps in some cases permanently. We had, several years ago, an experience of this kind in connection with using sulphuric acid (oil of vitriol) for certain experiments which we were making with galvanic batteries charged with the acid dissolved in water. The nails became ridged, and some of their individual cells raised above the general surface, and it was not until several years had passed that these effects ceased to be visible. Deceived by a name, persons often innocently use an article of which they would be very wary if they only knew of its real character through the name with which they are familiar. Vitriol has a much worse significance to the mind of the laity than has sulphuric acid; so also they have of *aqua fortis* a dread which they do not always feel in the case of nitric acid. A case of this kind came not long ago to our notice, where a lady, following out a recipe for cleaning marble, which she had happened upon in some book, bought quite largely of what she did not think of as a particularly dangerous liquid, and was shortly afterward horrified at learning that she had been buying *aqua fortis* under the (to her) innocent title of nitric acid, an article which she then recognized as most undesirable to have about a nursery.

CHAPTER XXI.

THE FEET.

NO portion of the body is more imposed upon than is the civilized foot. It alone, including in lesser degree, because numerically much fewer, the waists of some silly women who have no appreciation of what in feminine attributes pleases the eye of man, leads a life of duration vile and wretchedness that degrade and transmit evidence of previous servile condition to posterity. We do not, as that expression implies, place the two kinds of bondage in the same category as to degree of iniquity. We cite the two cases together, merely as representing the only two in which the human body is in civilization constrained to its manifest injury and degradation. The gartering of some women below, instead of above, the knee is not a hygienic nor a beautifying mode of securing the stocking, for it impedes circulation in the part and vulgarizes the contour of the calf of the leg; but that practice is a trifle, not in comparison worth mentioning.

An excessively small waist may be a sign of maidenhood, but suggests sexual deficiency, and in lessening sexual attraction defeats the end of its constriction. *Ex pede Herculem*, from a mere fragment we can judge of the whole person, says the Latin proverb, and no woman with a wasp-waist will ever persuade a man that it can merge into the grand contours of bosom and fine hips, any more than he can think of a rill as directly related to the ocean. Similarly we may say of the feet, that they, as well as the hands, symbolize the whole person. Their undue constraint results in destroying their natural accord with the person, and at the same time in lessening grace through restricted liberty of movement. There are men who lace, but

very few, and men who wear tight boots, but comparatively very few. It is civilized woman, of not the highest type of the civilization by which she is surrounded, who is the sinner in these respects.

We Americans are the greatest inventors of the world. Even Dickens, who was no lover of us nationally, although fond of our ducats, conceded that only Americans had discovered what to do with the small of the back,—“they sit on it,” he said. But, while we are the greatest inventors of the world, we are also the most servile imitators. Thousands of men, while pretending politically to look down upon the Britisher, anxiously copy his speech, his accent, and clothes. The fair sex, to a woman, without any similar pretense, frankly yields allegiance to Parisian rule in dress. It is not the Britisher, however, who has changed within a decade or two, his conceit pointing as steadily as ever to himself, as points the needle to the pole; nor the French either, whose self-satisfaction in supremacy within their own domain could not well be less than it is as undisputed. But, if we can be so original as we have proved ourselves, why cannot we stand in all respects more confidently alone? Granting the claims of fashion, yet there is a point where reason would seem to be more capable than it proves to be in dealing with fashion's follies in the interest even of the object of fashion,—to increase attraction. Has it never struck American women who have been addicted to wearing the most damaging of French shoes, in which a Parisian never thinks of walking, but reserves for the house or carriage, that the native-born type to which they belong is so singularly endowed with small hands and feet, in some parts of country verging on the danger-line of beauty, which we have indeed seen overpassed, that they have no need of affecting this elegance as if they had it not? If this be true, as can be proved by statistics, what an absurdity it is for them to pinch and screw their feet into shoes too small, when all they

have to do is to be handsomely and comfortably shod, and still as to their feet be far below the standard of size with which their foreign sisters step complacently on our shores.

Much has been said regarding the late barefaced way in which bogus, non-bogus, exhausted, ruined, impecunious foreigners have purchased American girls with their bogus or non-bogus, but always impecunious, offers of rank, and the humiliating phase of American girls being willing to transfer themselves for this titular vanity, when it is notorious that in no country has woman, whether as child, girl, or matron, so high a place as in this in chivalric love and respect. But, whereas the girls so disposing of themselves are palpably only "pleased with a rattle, tickled with a straw," sufficient credit has not been awarded to their captors for the good taste which they have evinced, their sole motive having been deemed mercenary. But let us look for a moment at the thing in the glass of fashion, by which to judge the mold of form, and see if we have done these foreigners the fullest justice. Be they real or spurious, lords or lordlings, counts or bogus counts, it will be seen upon scrutiny that they have an eye for other things besides the main chance.

The action of these girls has been characterized as outrageous from the point of view of morals. But we shall not be so severe in our thoughts, remembering that, for the most part, in the feminine mind, the mere practice, without the religious theory of matrimony, covers, like charity, a multitude of sins. We characterize it as unwise, from the fact that in America the wife holds the highest position which she has yet attained. We confess, however, that if we were a count or bogus count, or a needy foreigner of any sort, that, as we should not be expected to have any morals, we should be most happy to accept in marriage any rich American girl who is at the same time handsome and all that thousands of American girls are otherwise in delectability, and that is just what these men are doing. One

of them must be very forlorn indeed to demand only money for his rank. He must, as a general rule, have beauty, grace, vivacity, manners, education, or else the money-bags must be very heavy, and perhaps they will not even then suffice to tip the scale. It is only a very dilapidated American old maid who has to pay an inordinately high price for a poor specimen of a count like a barber. So we argue that great injustice has been done to the motives and taste of these foreigners, and impliedly to the charms of the American girls whom they preferably seek. They have a keen appreciation of the personal charms of these girls. With their sublime egotism, they only want the earth, and they get it.

Granting the brightness, vivacity, information, tact, grace, and all other attractive attributes of the girls, back of these, however, there must still be something in their physical characteristics which makes them so attractive to foreigners, for these qualities do not of themselves ever prove most powerful in sexual selection. The main attraction is through that principle which nature is continually manifesting as operative among human beings,—the affinity of opposites. Frederic the Great's regiment of giants left progeny of huge size at Potsdam, but we do not hear that the race has been maintained. If every tall man and tall woman, and similarly of the short of both sexes, should come together by elective affinity in marriage, what would become of the human race as we know it, even within the span of a hundred years? It is the delicacy of the traits of the American woman which attracts the average foreigner. After the whopping big feet and hands of many foreign women, especially of Englishwomen, it is delightful to see the sylph-like delicacy of the sex in America as to their extremities. And the whole person of the American girl partakes of this delicacy of physical traits, and, coupled with mental attributes, represents what foreigners find so attractive in her. Therefore, her reflec-

tion, as viewed in the foreign glass of fashion, which she has chosen to judge of her mold of form, being so satisfactory, it is folly for her to seek to exaggerate one of her physical traits which already verges upon excess.

The lowest type of foot is that of the negro. Its lowness is constituted by the simian flatness of the instep, the hollow of the foot being obliterated. The calcaneum, or heel-bone, standing at a considerable angle from the vertical, toward the rear, as a consequence lowers the arch of the instep. Instead of the foot as a whole being a high arch, it becomes none at all, from the fact that one of its abutments is thrown far away from the centre. In the highest type of foot the instep rises in a swelling arch. This trait may, however, like any other, be excessive. Then it becomes unsightly, and, reaching the extremest point, is a deformity. We have known a person who had a foot so short and an instep so high as to make the effect club-footed, and he (for it was a man) could not walk with ease. The Arab's test of elegance and refinement in a foot, that water will flow under its hollow, shows that early in the history of the human race anatomical differences in its types were recognized. The Arabs, as a conquering race, were very early thrown in contact with the negro in Africa, and their own Eastern elegance of extremities must have struck them as in strange contrast with the negro's rudeness of form of the same parts.

It should be axiomatic that nothing, except face and hands, can be so aristocratic as a well-dressed, shapely foot; nothing so plebeian as an ill-dressed, clumsy one; and nothing more vulgar than any foot in a shoe manifestly too tight.

CHAPTER XXII.

THE COSMETIC CARE AND TREATMENT OF THE FEET.

THE civilized foot presents one of the best proofs of the correctness of the theory, that it takes a vastly longer time to affect the congenital features of a structure than to affect the adult form of them. It must be remembered that, what we call civilization has endured for only a few hundred years, and that it is only during this comparatively brief period in the history of man that the foot has been unduly constrained. Going back to the period when statuary brings us face to face with the general condition of the foot in ancient times, we find that the great toe stood somewhat outward, instead of, as now, standing straight forward, or somewhat inward, which is, perhaps, the most common modern position of the member. Children of civilization, when first born, exhibit this type of foot, but, whether or not they subsequently go barefoot, later in life exhibit one of the two other types. This shows, what has been proved in many other ways in connection with animal life, that through continuous modification of function on definite lines, the animal, when first born, may not show any change in structure, although, at a later period of the individual's life, the long-latent impression may come into visible existence.

Great absurdities are uttered regarding feet. We have known a foot to be called handsome because it was inordinately small, when it had not a single handsome attribute, the one specially praised being so much in excess as to amount to a defect. A foot, to be really beautiful, must have a fine instep, perfectly straight and individually symmetrical toes; the nails of rose-pearly, not yellowish, tint; heel of gently outward curvature; and, in general contour, be softly rounding and delicately tinted with a rosy

heel and outside edge. Smallness of size, which must be considered in strict relation to the whole person, is also an element of beauty in it not to be despised, if not present in excess. It is a beautiful foot that we have described, hard to find, and yet existing, and possible of maintenance in its pristine beauty by those who are sensible, to whom nature has been gracious in her gifts. So born, it may be so nurtured as to be to its possessor a useful companion in the path through life; but, maltreated, will, as surely as fate, repay in misery the indignities to which it may have been subjected.

So much suffering is often caused by corns and bunions as to make those afflicted with them unable to taste of the pleasures, or even to be equal to the comfortable performance of the duties, of life. The pitch of misery which is sometimes reached in consequence of their presence is well represented in the by-word of a charitable old friend of ours, who, when seeing a person cross and crabbed without apparent cause, always remarks, "Oh, poor thing, his [or her] feet must hurt."

It ought to be said, in this connection, that the culpability of having corns is much less than that of having bunions. Skins differ so much in different persons in softness and pliancy, that an ill-fitting shoe, as well as one too tight, is capable of producing corns. The presence of a bunion, however, is proof positive that shoes have been continuously worn too tight. The difference in the cases lies in this, that one affection arises from friction, or from pressure on the skin, but the other from pressure on a joint; and the latter proclaims at once through sensation the injury that is being done, while the former may go on for a long time without producing any sensation at all. Besides, as the two positions where bunions occur are on the main joints of the great and little toes, in both of which, unless there be malformation of the foot, pressure from a shoe is lessened by its distribution over a large curved area, the existence of the bunion

proves that the pressure to which the parts have been deliberately subjected was enormous. Thrice unhappy he or she who has a bunion surmounted by a corn as legitimate heir-apparent to the throne!

Our advice is, Don't. Do not deliberately do that which is certain to entail discomfort and perhaps misery to the end of life. Avoid so-called cheap shoes, the dearest one can buy. Unless you happen to know of a number for ready-made shoes which represents a size that exactly suits you, avoid all ready-made shoes. The wretched period has passed when people had not even "rights and lefts," but wore what were called straight shoes, which were transposed every night, to shift their places in the next day's wear. Sensible, handsome shoes are procurable in every large city. Miserable ones are, of course, also to be found there, and so the purchaser, if wary, will avoid them. If there be no number among the ready-made shoes that represents for you an exact fit, have your shoes made to order, and do not take them unless you feel that they fit. Every one knows for himself or herself best where the shoe pinches, and whether or not it fits. Break in no man's shoes. The operation is at your untold expense. The test of whether they fit is to be found only by the sensation of feeling, not in the shoemaker's statement that they will soon come all right. The test for that sensation, as given by one of the best shoemakers whom we ever knew, was that in a well-fitting shoe one's foot feels like a duck's in the mud. The expression is not elegant, but a more elegant one would be less graphic.

Follow the guidance of nature; the shoemaker follows it in his own interest. Those worthy people sometimes flatter, as did the fox when he besought the crow up the tree, with a piece of cheese in her beak, to exhibit her lovely voice for his delectation. Nature prescribes that the toes shall lie straight, not be bunched up against their joints; that the sole of the foot shall

not rest on a narrow strip of leather, with the sides of the foot bulging over on the ground. Even fashion has at last come partially to see that nature is right, and is in some degree brushing impatiently aside former suffering and vulgarity in the wearing of shoes.

The corn is not the kind of formation described by charlatans. The wonder-mongers as to the simplest things stamp themselves as quacks. The corn has no root. It does not grow upward but downward, and it is thus protruded upward. Its root, if it could be said to have a root, would be in the tight point of the unduly pressing shoe. The reader can easily understand now, with the aid of the information in preceding pages as to the constitution and growth of the skin, that nature, in seeking to protect itself against injury, forms layer after layer of the horny layer of the scarf-skin over the point of pressure. The layer on top of a corn is the earliest, not the latest of the growths. The latest growth is at the bottom of all, directly in contact with disorganized mucous-layer tissue. This disorganized, unhealthy mucous layer it is which, when the corn as a mass is removed from the foot, clings to its base, and is triumphantly exhibited by the quack as its root. If you will examine fine slices of a corn cut horizontally across, you will find that they represent concentric layers of a horny substance, and this is the dead horny layer of the scarf-skin.

It follows, then, that, with proper attention to the feet, corns can be easily removed, and that, if the attention be assiduous, as it ought to be, they need never occur. By means of soaking the feet in warm water, which softens the dead horny layer of the scarf-skin, it can be peeled off until it is reduced to the single layer at the general surface of the foot. After that, if the attention be continuous, through bathing the feet in warm water, followed by the use of a delicate file and rough towel, the tendency to the formation of a corn at the place can be checked.

If the case be one of long neglect, then the only additional treatment to be adopted is, after the use of the warm bath, to soften the part, to reduce its size preliminarily by paring off the corn with a sharp pen-knife, being especially careful not to injure the surrounding flesh, or to cut to the quick the corn itself. After that, the routine, regular processes previously recommended will suffice to keep the corn suppressed until the end of the longest life.

Whenever one is so situated, pecuniarily and otherwise, as to be able to procure them, the services of a skillful chiropodist at regular stated intervals is a great luxury. Forty years ago a gentleman of this city advocated the employment of a skillful chiropodist with every regiment of the army, but, so far as we are aware, without producing any impression as to its signal advantage. Later, however, during our civil war, thirty years ago, some action was taken in that direction. Now, the greatest military power in the world, the German Empire, has finally introduced the practice of employing chiropodists with the army. What, however, applies to a couple of millions of soldiers, representing persons drawn from many classes of society, does not apply, at least as obligatory, to very many persons, and, least of all, to gentlemen and ladies.

The soft corn, which sometimes ensues from a single day's hot marching or walking, and often presents itself between the toes, partakes of the nature of a blister. It is easily reduced within a few hours by the use of small, rounded pieces cut from an old, white-kid glove, with holes made in the centre, so as to keep away all contact from the excrescence. White kid, being without dye, is preferable to colored kid for the purpose. It is, also, independent of the fact that dye is poisonous, and that it hardens leather, better for the purpose, from the circumstance, not generally known, that the best kid—that which is most soft and pliable—is reserved for undyed gloves, dye to a certain degree disguising quality.

The bunion can sometimes be reduced by the process of applying, with a camel's hair brush, tincture of iodine to the inflamed part, or by the application of a soothing poultice, such as one made of flaxseed, or of flaxseed and slippery elm. Sometimes the great mistake in treatment is made, of cutting a hole in a snugly-fitting shoe, just large enough to uncover the inflamed area and no more. In the confined parts of the foot, thus uniformly constricted, the circulation is equalized on that large surface, and remains sensibly undisturbed; whereas, inasmuch as the free part of the foot tends to rise through the opening, the edges of the whole press harmfully on the diseased part. The consequence is that the blood tends to flow into and engorge the diseased part, the condition of which, from increasing pressure from these cumulative causes, becomes worse and worse. The best course to pursue for reducing the inflammation and swelling is to give the part perfect rest in a loose slipper. If this be not feasible, then the next best course is to make the hole in the ordinary shoe so large as to uncover not only the inflamed area but a large margin all around it. By this plan the tendency of blood to the part is not stimulated, and the inflammation and engorgement of the part intensified; but, on the contrary, it is relieved of all stress as the indispensable condition of its getting well.

The prompt cure of this affection is most important, for if the synovial membrane, the membrane lining the joint, should become seriously diseased, and its secretions abnormal, the ailment becomes chronic, and life-long suffering, increasing with years, may be entailed. Such a condition, we need hardly say, debars one from many legitimate pleasures otherwise easy of attainment. We have in our mind's eye now the case of a lady, who, a few months ago, came to Philadelphia for a visit of two weeks' recreation, when, in consequence of having resumed while traveling shoes too tight for her, her old ailment of an inflamed

joint recurred, and she was unable to stir out of the house during her whole stay in the city. The case, as one of imprudence, is all the more remarkable because, only a year before, she had had, under precisely the same circumstances, fair warning of what was likely to happen if she persisted in wearing shoes too tight, for on that occasion of a visit to the city for recreation she had, through the same imprudence, been able to pay only a visit or two before she was confined to the house with the inflamed joint for the remainder of her stay. This is certainly a heavy penalty to pay for original and continued petty tribute to vanity, still lingering sufficiently to postpone cure, or perhaps to remove all rational hope of it forever.

The two following formulæ represent good prescriptions for the treatment of corns and bunions :—

1. Borate of sodium, 1 drachm.
 Extract of cannabls,. 1 scruple.
 Collodion, 1 ounce.

Paint over the corn or bunion every day once or twice, and after five or six applications the superficial growth can be scraped off.

2. Salicylic acid, 1 drachm.
 Cocaine, 5 grains.
 Collodion, ½ ounce.

Paint over the corn or bunion twice a day, and scrape away the superficial growth at the end of three or four days.

The two following recipes will be found good for the treatment of chilblains :—

1. Camphor, 1 drachm.
 Beta-naphthol, 10 grains.
 Cocaine, 5 "
 Diachylon ointment, 1 ounce.

2. After bathing the part in hot water, balsam of copaiba is painted over the surface.

The *Canadian Practitioner* once gave a recipe for the removal of corns, without any further voucher for it than that

it was quoted from the *Medical Courier*, quoting *L'Union Médicale du Canada*. Whether or not it appeared in the first print with the name of the author, we do not know. As, however the prescription is harmless, and seems upon its face to represent what may be an efficacious treatment, we here give it with this explanation :—

Phosphorated oil (boiled oil) 1 in 300 is recommended by the *Medical Courier*, without giving the author's name. Every morning, with a brush dipped in the phosphorated oil, that portion of the stocking in contact with the corn is soaked. In about a fortnight only a thin pedicle remains.—*L'Union Médicale du Canada*.

The best plan to adopt to rectify ingrowing nail, short of the necessity for surgical interference, is to cut the end of the great-toe nail short, and almost square across, so that it shall not exert the slightest pressure upon the nail-bed. Thus its forward growth being unrestricted, its tendency to lateral spreading will be sensibly relieved.

Of course the general cosmetic care and treatment of the nails of the feet do not differ from the general cosmetic care and treatment of the nails of the hand, already described in their appropriate place.

In connection with the nicest care of the feet, the use of a smooth piece of pumice-stone is found very useful for keeping the sole and outside edges soft, through reducing the thickness of the cuticle there, which has a tendency in those parts to become callous through thickening, as the result of friction and pressure from exercise.

There is a disease called bromidrosis, characterized by fetid sweating, the affliction from which obviously does not cease at the suffering of the patient. The feet do not escape it, but, on the contrary, the disease, when local, preferably attacks those parts. Owing to the number and largeness of the pores there, their consequent capacity for copious exudation, and the confined manner in which the feet are dressed, they are of all por-

tions of the body those which can become most offensive. Leather is porous, and freely yields effluvium to the air, besides being capable of much absorption. When made into shoes, it has added to its natural capacity for absorbing and transmitting odor that derived from the presence of the lining of the shoes. Even shoes cleaned by mixing the blacking with saliva have an unpleasant odor, because saliva is a digestive fluid, and in becoming stale, in contact with soluble matter, becomes also putrid. We are glad to say that already a movement is perceptible to do away with the dirty practice of using saliva in connection with the blacking of boots and shoes. When we see men in cars putting their odoriferous shoes in disrespectful proximity to ladies, we often have occasion to reflect how much faster the material prosperity of the country is proceeding than what should be its accompaniment in good manners.

Bromidrosis may be physiological, appertaining to healthy function, or pathological, appertaining to diseased function. An instance of the former condition may be observed in the pure Negro, and, as we individually believe, markedly to some degree in the North American Indian and in some other races, although the fact is not generally known. When the condition is pathological it may be constitutional, or it may be temporary, and it may in any case be general or local. The commonest form of the affection is, as we remarked, as localized, and the locality of its predilection and most unfortunate choice, the feet. When reaching a certain degree of virulence, the excretions become most irritating to the flesh, which is excoriated and tender to the pressure of the weight of the body in standing. If the affection be physiological, or be individually constitutional, frequent ablution with one or other of the soaps recommended for that purpose in our list of medicated soaps and frequent change of clothing will afford relief. If, on the contrary, the affection be distinctly a disease, recourse should be had to the advice of a

physician, as the treatment that should be adopted depends upon too many conditions to warrant giving a general prescription for what is, of necessity, in every instance a special case.

There is also a disease called hyperidrosis, characterized by copious, not fetid, sweating, which, as it sometimes involves the feet, should not escape notice here. For this the sufferer should go to a regular physician for constitutional treatment, for no man is in all respects as any other man in either health or sickness. In this disease frequent bathing is not indicated, but only occasional bathing of the parts in hot water, with the use of dusting powders and other external combined with internal remedial measures, which no one but a regular physician, with the patient before him and a full history of his case, is equal to judiciously prescribing.

Every man has his idiosyncrasy within a general likeness in temperament to other persons. He has his past history, which is exactly like no one else's. And he has his present condition, which is identical with no one else's. This disease is most erratic in its manifestation. It may be general or local, may be on one side or both, may be strictly localized without reference to side, and, finally, may be one of the signs of much more serious affections, such as consumption, nervous prostration, etc. The copious exudations caused by it frequently prove very annoying, and proceeding beyond that point, especially when the feet are attacked, they macerate the flesh and expose raw and painful surfaces of the corium. We counsel any one who is afflicted with the disease to resort at once to a physician for his advice. A friend of ours, who makes in consultation with us a great many experiments for discovering curative effects in electricity, has lately communicated to us what may prove an invaluable treatment for hyperidrosis. He suppressed, with one or two mild applications of the galvanic current, directly to the parts, by means of the sponge-covered poles of a battery, a long-standing,

persistent case of localized hyperidrosis. We are inclined to believe that this treatment will prove universally palliative or curative in the affection, from the fact of our holding the modern medical view, that such morbid conditions as are represented by this disease depend upon a lowering of the nerve tone, which the galvanic current, judiciously administered, certainly tends to restore.

CHAPTER XXIII.

THE CONSTITUTION, GROWTH, AND DISEASES OF THE NAILS.

A DESCRIPTION of the constitution, growth, and diseases of the nails naturally follows an account of the cosmetic care and treatment of the hands and feet, for the nail is subject to unhealthiness, not only from partaking of loss of tone with the general system, but from specific disease, from the action of powerful chemical agents, and from mechanical injuries. We mentioned, in the chapter on the cosmetic care and treatment of the hands, our own individual experience with the nails, in temporarily injuring their healthy nutrition through incautiously dabbling for several months in water highly acidulated with sulphuric acid. If a cause like this could affect nails unfavorably, it can easily be realized that many others of which the reader may at present have no knowledge would seriously injure them.

We have learned, in connection with our examination of the constitution and growth of the skin, that that portion of it called the scarf-skin is pierced up to the under side of its horny layer by microscopic papillæ that rise from the surface of the corium, the sensitive skin, the true skin. In fact, these minute papillæ with single nerves may justly be regarded, so numerous and close together are they, besides being constituted like the corium, as a large extension of the corium upward to the under surface of the horny layer of the scarf-skin. Now, the nail is only a modified form of the horny layer of the scarf-skin, and the nail-bed is the mucous layer re-inforced by the corium in parallel folds, instead of the corium with, as usual, a smooth general surface from which papillæ rise. The nature of the structures and forces in play is virtually the same; it is their

arrangement and deployment that are different, and the modification resulting is the exaggeration of the horny element of the scarf-skin. That is to say, in a word, that, regarding solely the principle of the mode of generation of the scarf-skin, the principle is found to be the same in the generation of the nail, and the nail corresponds with the horny layer of the scarf-skin.

The corium, or sensitive layer of the skin, is arranged in parallel ridges running lengthwise under the nail, serving not only to receive through it the sensation of touch, but to supply to it, through the mucous layer of the scarf-skin, the elements for its increase in thickness. It follows from the fact that the nail-bed lies in parallel ridges and valleys of the corium, and the other fact that this peculiarly constructed surface it is which is affording to the lower side of the nail its elements of growth, that the under surface of the nail is formed as if cast in the mold of the ridges and valleys of the underlying corium. That is exactly the case, the ridges of the corium corresponding to depressions of nail, and the valleys of the corium to ridges of nail. Examine the relatively smooth surface of the outside surface of the nail, and you will perceive upon it longitudinal parallel striations or streaks differing slightly in tint. The pinker ones represent ridges of the highly vascular corium rising into a groove of the nail-substance, and the paler ones the base of ridges of the nail-substance filling grooves of the corium. The cause of this difference of appearance in the different lines of striation is that in the former case you see the red corium through less thickness of horny matter than you do in the latter case.

The matrix, or root, of the nail is embedded in a fold of the skin. In the case of the adult thumb, it lies back of the visible part of the nail to the rear by about a tenth of an inch. Just in advance of the matrix comes the little white half-moon called the lunula. Beyond that comes the general nail-surface,

partially directed in its onward course of growth by the nail-groove, as it is called, which frames its sides with folds of skin.

Let us now examine more particularly into the nail's mode of growth in length and thickness, for, as is inferable from what has been said, it does not start out from the matrix full-grown in thickness, but grows in thickness as well as in length until it passes beyond the nail-bed. Its growth in length is determined by the capacity of the individual matrix, included within the bounds which nature has set for range of growth in nails. The nail starts forward in its growth in length, perforce of the formation of its characteristic cells by the matrix. That is to say, the generative agency is also the propelling agency, for, as the matrix forms the cells and continues to form them, the nail thus created must move on the line of least resistance, and that is obviously directly away from the matrix, along the corium-grooves and the nail-groove. The nail-bed, in generating and nourishing the lower surface of the nail, having increased its thickness and given it a formation corresponding to its own, the nail readily obeys the impulse to move forward given by the multiplication of cells at the matrix. It is, moreover, rigidly confined to this course, through the fact that the corium, lying lengthwise in ridges parallel to the bed of the nails, thereby forms parallel tracks from which the nail cannot escape.

Where we see the lunula the nail is quite thin, its tendency to growth in thickness being comparatively slight there, the whiteness of the lunula indicating the comparatively small vascular supply there, vascular supply being strictly proportioned to increase of animal tissue, whether of healthy or morbid growth. But, immediately beyond the lunula the nail evidences, through its rosy hue, the existence of rich vascular supply to that portion of it, and over that portion it is that it receives the main contribution to its thickness.

It will now be understood why the nail is so sensitive.

Although the ridges and valleys of sensitive skin into which the nail fits are shielded by the dense mass of the horny matter of the nail, they are still capable of receiving the most accurate transmission known of the character of one physical condition of matter,—smoothness. This was so well known to the Romans, that they spoke of nicety of finish to a superlative degree as we speak of a thing as being accurate to a hair, by saying that it was finished *ad unguem*, to the touch of the nail. The Greeks had the same perception, and used a similar expression. The Greeks, and the Romans following them, tested all exquisite finish with the thumb-nail, the final fleck in modeling in clay being removed with the thumb-nail, and the finished piece of statuary being regarded as perfect only after having been submitted to the test of passing over doubtful parts the critical and appreciative thumb-nail. We have often experimented with this test, and have found it a crucial one as to smoothness. Run the middle of the end of the thumb-nail over any surface which you regard as virtually smooth, and if there is the most minute eccentricity upon it, the jar to the end of the nail will be communicated accurately to the sensitive skin beneath the nail, and accurately registered in the brain, even to the point of definition of the size and shape of the obstruction. We have often observed carpenters, painters, and other workmen, who certainly have not all familiarized themselves with the practices of the Greek and Roman artificers, automatically examining surfaces with the thumb-nail, as if the movements were strictly instinctive.

The white marks which one sometimes observes on the nail are not primarily from a defect in the nail-substance, but from one in the corium beneath it. The corium, having received some slight injury, ceased for a brief space of time, while it was recovering, to yield through the mucous layer at that point, which has passed onward since, a normal supply of nail-substance.

Mechanical injury to the great-toe nail is of very common occurrence. The wearing of shoes that are too short, and especially of those which have at the same time high heels, in consequence of which the weight of the body is partially supported by the point of the great-toe, often restrains to such a degree the growth of its nail, while jamming the root into the socket of its matrix, as to force it to grow laterally, and either produce the very painful affection of an ingrowing nail, or abolish the power of cell-proliferation at the matrix, or perhaps accomplish both of these results simultaneously. These affections are never radically cured until, through rest and proper remedial medical measures, the normal function of nail-growth is restored, and this, in the case of the complete abolishment of cell-formation at the matrix, it is impossible to restore, and the sufferer remains, through thickening of the nail without any forward progress of it, more or less of a cripple all through life. The reader can understand, upon the basis of information previously conveyed here, that this condition must supervene from serious injury to the matrix. Because the capacity of the matrix to generate cells and push the nail forward is abolished, that does not affect the capacity of the mucous layer of the scarf-skin and the corium beneath the nail to go on indefinitely increasing it in thickness. Under the circumstances supposed, the nail grows from below, layer by layer in thickness, until it makes an enormous mass, becoming thus an essentially foreign body, so large and painful as to forbid the wearing of an ordinary shoe. Sometimes one of these enormous masses is shed, sometimes one of them requires surgical interference for its removal. Some diseases of the great-toe nail necessitate its extirpation. We knew an old lady who suffered during the latter years of her life the greatest torture from her feet, the condition of which was not known until her demise, when it was discovered that the thickness of her great-toe nails was enormous.

These huge masses of nail, of which, of course, the topmost layer is the oldest, and sometimes truly ancient, are yellow, lustreless, friable, like pieces of refuse horn. Dr. Erasmus Wilson says, in his chapter on the nails, in his admirable little work on the skin and hair :—

I know an instance in which the nail is regularly shed ; whenever the old one falls off, a new one being found beneath it. Sometimes growth in length is not entirely checked, although growth in thickness is induced, and then we get some marvelous specimens of toe-nails. I have several such in my possession, one being fully two inches long.

The nail shares in the well- or ill-being of its possessor. In cases of long-continued depression of the general system, it, as well as the hair, changes so radically in appearance as to attract the attention of the most casual observer. In lesser degree of sickness, or in that which is merely temporary, its varying condition is significant to the more critical medical eye. In treating affections of the nail, whether they amount to marked disease or merely to depraved condition, constitutional treatment should not be neglected. This means that all hygienic measures should be adopted in food, air, exercise, etc., and, in addition, that some tonic should be prescribed.

The nail is affected by, or, more precisely speaking, participates in constitutional defects of the general system. Its appearance in persons of pronounced consumptive diathesis is quite as characteristic as is the appearance of their teeth and hair. It is affected by acute and chronic diseases. It is also liable to its own localized diseases, whether organic or functional. Three of these, besides that already described in detail, are onychogryphosis, paronychia, and onychomycosis.

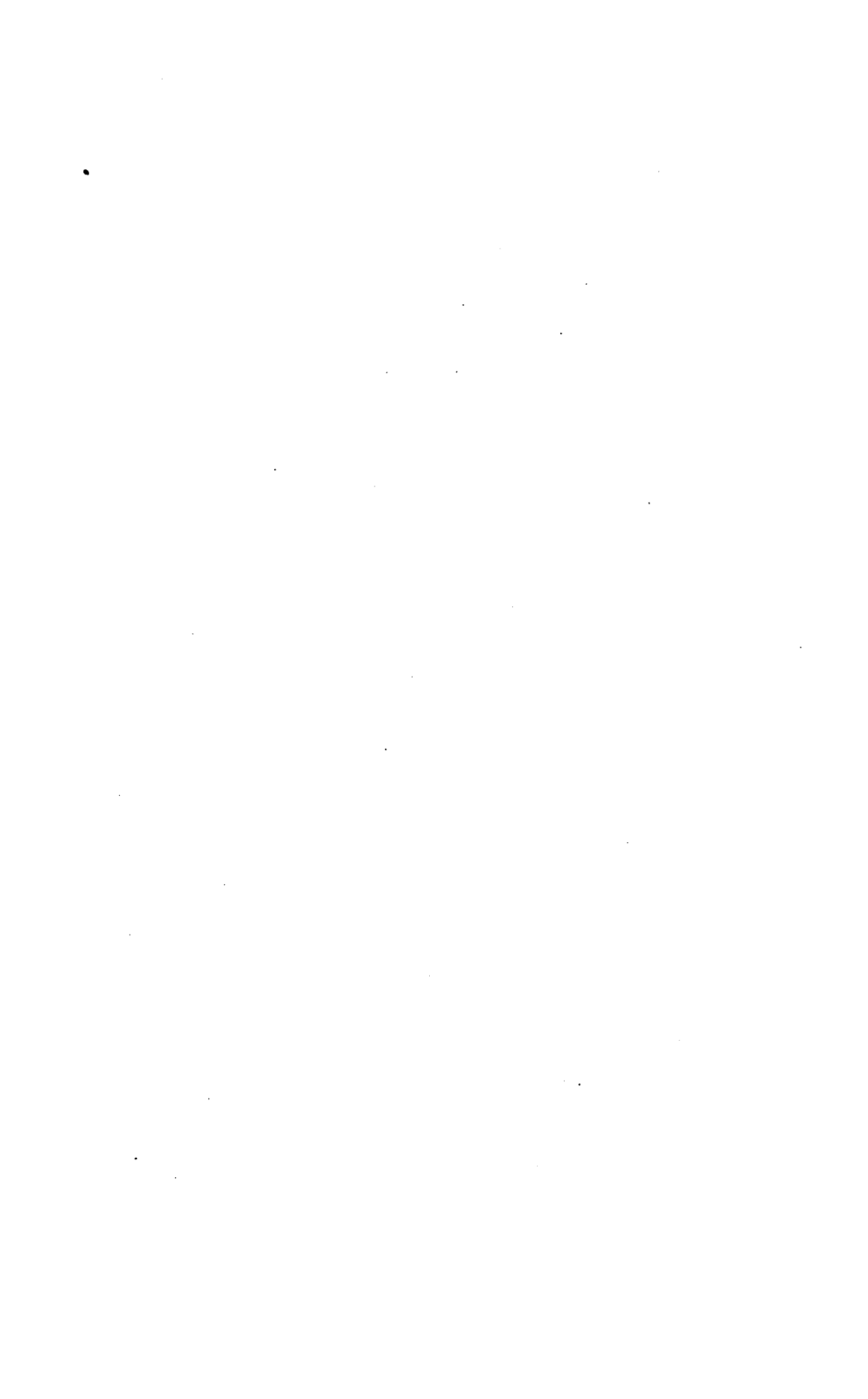
Onychogryphosis is simply an organic defect in the shape of the nail, which grows with a decided curve from front to rear, giving it the appearance of a talon. It was in view of the unsightly effect produced by this form of nail, even when existing in only slight degree, that we were led, in the chapter on the

cosmetic care and treatment of the hands, to caution persons having it, to however slight a degree, to be especially careful to keep the nails well trimmed. The truly-formed nail has no marked curvature from front to rear. It curves only from side to side, and that curve is a flattened one. Nothing can be more repulsive than the appearance of the nails of a person who, with curvature in them from front to rear, associated, as it always is, with too sharp a curve from side to side, allows them to grow beyond the end of the finger, thus producing the effect of a veritable claw. Of course, there is no possibility of rectifying the defect of this organic growth. All that any one can do is to palliate the condition, by being careful, through paring the nails, not to let its effect be intensified.

Paronychia has been, in modern usage, divided into four varieties, of which one is what is popularly known as "run-round," the other three being resolvable into what are known as different stages of whitlow.

Onychomycosis is a parasitic fungous disease. When the fungus which represents the disease preys upon the nails, they lose their translucency and become laminated and brittle. Both the nail and the nail-bed are diseased through their penetration by the fungous growth, the nail, as a whole, becoming bulkier and tending to disintegrate. Of course, it will be understood that, as a general rule, the invasion of a fungus means previously-lessened resistance through imperfect functioning of the parts.

The moral of all that has been said in this chapter is, that if we would not risk a greater fall to our vanity than ever it had rise, which, although a physical impossibility, is not a moral one, let us look out for our toes.



CHAPTER XXIV.

THE CONSTITUTION AND GROWTH OF THE HAIR.

THE reader may be surprised when told that the hair, as well as the nails, is a modification of the scarf-skin. It is nevertheless true, as the human eye, aided by the microscope, proves. Attention to the following general description of the main features of the constitution and growth of the hair will be amply repaid by knowledge valuable as a protection against the charlatanism of ignorant instruction as to the care of this important adjunct of the body.

The hair on the person is distinguished, even by the naked eye, as consisting of four different varieties. The first and most important of these is the long, smooth, and pliant hair of the head. The second is the shorter and coarser hair on the face of the adult of the male sex, and, on the adults of both sexes, under the armpit and on the pubic parts. The third is the still shorter and coarser hair of the eyebrows, eyelashes, nostrils, and orifice of the ears. The fourth is the exceedingly short and fine hair, called lanugo, which, almost imperceptibly to the naked eye, covers the general surface of the body, with the exception of the palms of the hands, the soles of the feet, the lips, and the mucous-membrane passages into the body. These varieties exhibit slight organic differences among themselves, as indicated by their constitution and growth, but not sufficient to invite attention here to an examination of their similarities and dissimilarities. It will be, for the information of the general reader, enough if we confine ourselves to the consideration of the character and growth of the hair of the head, as the highest type of similar products of the body.

It is from rude conceptions of material things that we rise
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to our highest conceptions of them. Our preliminary conception is, in fact, nothing but a summoning before mental vision of one of our previous rude perceptions. These rude perceptions are, in turn, through an intellectual process, transformed into conceptions representing a higher order of perception. We are about incidentally to illustrate this truth, by remarking that the reader must first of all conceive of the place whence the hair grows as a vase,—a longish vase, with a narrow neck, and a slightly flaring funnel-like rim, the lines all flowing gently into each other without the slightest abruptness, and the rim of the vase melting, as it were, into the upper surface of the scalp of the head. That is a very rude conception, truly, to begin with, but it is absolutely necessary to begin there, if one would finally comprehend this formation, which we are about to describe. We rise to knowledge from the foot-hold of what we have seen or touched and know, not from what, being the unseen and untouched, we do not and cannot know.

Let us now, as the next step, refine upon this conception of a reminiscence of a former perception, by saying that this vase is so minute, that if one could submit a man and it to the same magnifying power, of about fifty times of apparent increase in size, the man would look about three hundred feet high. Now our vase disappears as the rude conception that it was at first, and we have left in the imagination simply a microscopic form defined by an outline of matter of some unknown kind, which remains to be described. That is the vessel, so to speak, in which an individual hair grows, just as a flower grows in a flower-pot.

Here we have again a rude conception from which to start, in the expression, "just as a flower grows in a flower-pot," from which conception we must mount, as before, to a higher plane of understanding. At the very bottom of this inclosing vessel, called a follicle, formed of an inner and outer sheath in contact

with each other, is embedded and slightly protruded through the bottom the germ called the papilla of the hair. This papilla is entirely enclosed and clasped by the bulb of the hair, a rounding, pear-shaped object, with the large end upward, and from this rises the root of the hair, and from this, in turn, at the surface of the scalp, rises the shaft of the hair, or what is called simply a hair.

Let us now, upon our present basis, refine still further upon our conception. We have now the root-sheaths of the vase-like vessel, corresponding to the flower-pot; the papilla, corresponding to the seed; the bulb, corresponding to the first bursting of the seed; the root, corresponding to the first determinate upward growth within the soil; and the hair-shaft, corresponding to the stem of a plant above the ground. But, now are to be noted important differences in the growth between such a vegetable product as that indicated and the animal product of a hair. Excepting at the point where the hair escapes from the scalp, we must not imagine the parts described to be loosely bound together. On the contrary, the papilla, the bulb, and the root of the hair are all closely invested by the inner and outer root-sheaths. So, in this organic apparatus, we have, not as in the case of a flower-pot, an inert mass of matter, the stem of a plant growing from a seed; but a seed, bulb, root, and containing-vessel, all vitally combining for the production of a single plant—a hair.

We are now prepared to understand the minuter details of this structure. We will not go into the question of the minutest of them, for those are derived from histological research with the microscope, which discerns that the cells from the hair-bulb change in constitution and shape to fit them for positions which they occupy in the hair-shaft. This constitution, omitting the mode of its formation, we will now proceed in general terms to describe.

If we could express the first idea necessary to be seized, to

enable us to proceed, by any other term than "invaginate," we would do so with pleasure, but, as there is no popular equivalent for the term, we begin by explaining its meaning. If you thrust your fore-finger into a lump of dough, the inner surface of the hole made would not be invaginated, because the outer surface, except at the point of the finger, would not have been conveyed into the hole. If, however, you take an imperfectly inflated India-rubber ball, and make a dent in it, the interior of the dent is invaginated, because it possesses a surface like the general surface, and continuous with it.

Now, the root-sheaths of the hair and the hair itself are simply the scarf-skin and corium of the scalp invaginated in the scalp and modified. Thus economical is nature in its works in the expenditure of material and force. The scalp of the head simply dips inward in a multitude of places over the head (on an average, about 100,000), and forms the wherewithal, in structure and function, for the production on the head of its valuable covering. The reader, now firmly grasping the idea that the epidermis and the corium, in their relative positions, dip into the scalp, and make the follicle and hair, is in possession of the main facts connected with this growth.

The cells of the bulb of the hair are continuous with those of the outer root-sheath. If the reader demur at this statement, in view of the fact that it has been said that the bulb is at the very bottom of the inside of the root-sheaths, we explain that, at the bottom, the inner root-sheath has been fined away to nothing. The inner root-sheath, in fact, is generated by the cells of the root, which, the reader will remember, surmounts the bulb, and we may add that it is also fined away to nothing at the neck of the follicle. It is in so intimate contact with the root of the hair that we cannot pull out a living hair without pulling with it the major portion of the inner root-sheath. As it ends before it reaches the bottom of the outer root-sheath, and also ends before

the follicle emerges into the open air, and, as the root is so closely invested by it, the reader cannot fail to see why, in pulling out a hair, the inner root-sheath should be withdrawn with the hair from the follicle.

Immediately on top of the hair-papilla, as it lies inclosed within the bulb of the hair, takes place the most energetic proliferation (production and sending forth) of the cells which form the root of the hair, this action resulting in a formation which is the same in constitution as the hair-shaft itself. This consists of the medulla, or pith of the hair; the cortical substance, or bark of the hair; and the thin cuticle, or horny outside layer of the hair. The medulla is composed of many-sided cells; the cortical substance, of fibrous cells fastened together with a cement-substance; and the cuticle, of cells which begin at the root of the hair as rounded, and become elongated as they ascend the root of the hair and thence become part of its shaft. The cells on the hair-shaft overlap each other like tiles upon a house. On exquisitely fine hair the positions of the overlapping points cannot be detected by the sense of touch, but if one will take a coarse hair, such as a hair from the beard, and pull it through between the middle of the thumb-nail and the end of the fore-finger, tightly clasping it throughout its course, their position in places will be distinctly felt.

The medulla and cortical substance are not conspicuous in all hairs, the cortical substance containing the chief part of the coloring matter of the hair. The medulla is supposed to be actually absent in certain hairs, but not those of the head. We think it probable, however, putting out of question for a moment the hair of the head, that it is often present as to structure, but not recognized, through absence of nucleation in cells, as being in existence. Sometimes, on the contrary, as in the hair of certain of the lower animals, the cortical substance is in excess, the two outer layers forming a mere film.

Certain facts seem to warrant the supposition that the medulla may sometimes be invisible, of which we here set down one or two examples. Some caterpillar-hair, which we lately examined under a high power of the microscope, was to the microscope, as well as to the naked eye, colored in alternate bands of black and maroon color. Under the microscope, the dark part on an individual hair seemed to be such solely because it was highly corticated and medullated. As an abnormal affection, the same condition in an irregular form is sometimes observable in human hair. We see the same phenomenon in the porcupine-quill, in feathers, and elsewhere. In all of these cases the construction to serve cortication and medullation is probably always present, but we do not in places see it as such, because it is not differentiated from the others by stain from pigment.

In some fine blond hair of a child which we lately examined under a high power of the microscope, the medulla and cortical substance hardly differed in color from the outside of the hair. In the hair from a black beard, experimented upon at the same time, the appearance of the medulla and cortical substance so preponderated that the cuticle of the hair would not have been visible but for perception of the shape of its scales. One of the most curious results of some of our late examinations of hairs under a high microscopic power was that resulting from comparison of hair from different portions of a Yorkshire terrier. The Yorkshire terrier has, as is well known, a dark-blue back and fox-colored parts elsewhere, except on top of the head, where the color of the hair becomes almost blond. Several things discovered we were not prepared to find. First of all, the thickness of the blue hair is enormous as compared with the thickness of the fox-colored hair. Secondly, the hair on top of the head, which has the feeling of floss-silk to the touch, is even finer than that, and finer than the finest human hair, excepting, of course,

the first growth at birth. We had expected to find the appearance of the blue in the blue hair considerably modified in appearance as enormously magnified, but, on the contrary, it remained as blue as before to the sight, with an undertone of purple. The fine hair on the head seemed to be absolutely without medulla and cortical substance,—to be homogeneous throughout. It looked like the finest strand of glass just tinged with the most exquisite yellow. Therefore, the fact is that it was colored, as it was colored yellow; and, as the medulla and cortical substance, not the cuticle of the hair, are the vehicles of color, we cannot escape the conclusion that many hairs which are believed to have no medulla may possess the structure not visibly present, and they certainly must possess cortical substance.

It is easy to see, from what has been said here and in the preceding chapter on the skin, why, under certain conditions, refraction and diffraction spectra are formed by the hair. We have sometimes seen in the curve of a horse's neck, just above the fore-shoulder, when it was standing in a blaze of sunlight, the most beautiful prismatic effects. Here are the conditions necessary to the phenomenon,—the direct, white rays of the sun; the concave depression in the neck, making the hairs stand at various angles; the three kinds of cellular formation in the shafts of the hairs; the coloring matter in the cells forming the shafts. The white light is broken up by refraction and diffraction into rays of different wave-lengths, and consequently different colors, and they are thus reflected to the eye. Similar effects, of less intensity, may sometimes be seen on the convexity formed by the glossy croup and the concavity of the neighboring parts of the flanks of well-groomed horses.

In speaking of the coloring matter of the hair as conveying its effect, we should add that what is referred to is its main effect. It has long been known that extremely minute vacant spaces exist in the hair, called vacuoles, filled with air or some

other gas. This physical condition, combined with color, goes to produce the final effect of the hair upon the eye. There are probably still other factors that go to produce the final effect. Every one has observed that the handsomest hair is not that which has uniform tint and lustre throughout, but that which has glinting surfaces, which enhance while harmonizing with the general effect. This accounts for the fact that black hair, or very dark hair that is almost black, is never so handsome as hair of lighter color. There is in it very little, if any, transmitted light. We see it virtually by reflected light from its surface, not by light which permeates it and is then reflected, blended with other light which is reflected without having been first transmitted. At the opposite extreme, we have the medulla and cortical substance of the hair so colorless as to transmit light too easily to produce variable effects in the hair, and in one case reach the unhandsome character of hair of the color of tow. We see here, as in all of nature's work and man's striving, the essential need of variety to confer pleasure. Be the color of the hair what it may, from blond to brown and chestnut and auburn, if it but have the glints that come from variety of structure and pigmentation in the individual hair, the hair is handsome; if it be densely colored by nature, or, far worse, dyed by art, it loses beauty possible to it as the effect of the refraction of light.

With the mention of one or two other points connected with the constitution and growth of the hair, we shall conclude with general observations on the subject, which the reader will then be able fully to understand.

At the narrowest portion of the hair-follicle, at its so-called neck, the ducts of one or more sebaceous glands enter the follicle and supply the contained hair-root with the sebaceous matter which the glands secrete. Every individual hair-follicle is also supplied with small muscular appendages. These, lying at an acute angle with the follicle, to the inside lower portion of which

one end is attached, while the other is fixed in the corium, in contracting change the hair-follicle from its normally oblique position toward the vertical one. The hair-root and hair, rising toward the perpendicular, produce the effect known as the "hair standing on end." When this effect, which is involuntary, the muscles concerned in it being involuntary ones, is produced in an exaggerated degree, the opening of the hair-follicle is spasmodically puckered up and protruded, and the surface of the skin assumes the roughness known as "goose-flesh." Either fright or sudden cold occasions these effects. In the case of fright, the central nervous system, stimulated by ideation, is responsible for the condition. In the case of cold, the effect is produced by simple reflex action in response to the stimulation of the surface of the skin.

To the best of the knowledge of anthropologists, there is no distinctively hairy race on earth, although there are peoples more hairy than other peoples, individuals who have an abnormal luxuriance of hair, and other individuals who have a growth abnormal with respect to sex or age, as in the case of a so-called "bearded lady" and her little son, with whom we once had the pleasure of dining daily on a sea-voyage. The lady had what would have been considered in a man a very fine, full beard, and the boy, who was about 5 years of age, had a hirsute covering on the lower part of his face, that looked like a rat-skin, and bore ample promise of future compensation in dimes. The inhabitants of that singular island in the West Pacific, called Easter Island, are said to be bearded, although the beardless type of the human race obtains in that quarter of the globe. This is one instance of a relatively hirsute people. We shall eventually know more about them, through the interest which has been excited in the island, by the great find there of idols, some of which were taken to the Smithsonian Institution lately. Some other islands of the Polynesian archipelago

are said to have hairy people, but generally their inhabitants cannot be so characterized.

In short, the freaks of nature exhibited at dime-museums have heretofore represented nothing but their own individuality, which, unfortunately, is transmissible; for, in one case, well known and thoroughly investigated by scientific men, three generations had shared in the dreadful deformity of hirsuteness all over the body. These cases are doubly strange, for there seems to be some mysterious connection between this abnormal growth of the hair and the teeth, these hirsute monstrosities being generally deficient in dentition. The belief that there are normally hairy races has always been very prevalent. The *Medical World* published a long article on the girl known as "Krao," or, the "Missing Link," in favor of the supposition that she was one of a race of hairy savages in the north of Siam. There is, however, no such race anywhere in Siam, and, so far as known, no such race anywhere in the world. If there be any, Africa is the only land where it can be dwelling, and Africa has not, so far, made any such revelation.

Persons have thought that the pigment of the body is of the same color in all human beings, and that different races and individuals are characterized merely by the presence of different amounts of it. This is not true, the pigment varying in color among different races of mankind, and in amount among individuals of the same race, the lightest blonde having some pigment in her skin. The tint of the lightest visible drawing in India-ink, as compared with the lightest visible drawing in sepia, is entirely different in tone. This illustration alone ought to show that no tint in the skin, from the slightest trace of coloring matter to the densest black, can be produced by the same color of pigment.

The probability is, that in the same individual the pigment throughout the body is the same in color, and only variable in quantity as to places; and that that portion which pervades the

hair differs in appearance from that which pervades the skin only from the fact that it exists in the former in greater quantity than in the latter, and also under very different conditions. The difference of coloration, as between that of the skin and that of the hair of the same individual, can be in sum accounted for thus, by the respective amounts in the skin and hair of the pigment-substance, and the respective differences of construction between the scarf-skin and the modified form of it constituting the hair.

The hair-bulb supplies pigment-granules to the medulla and cortical substance of the hair, and these, growing upward, charged with color, give what we know in the shaft as the color of individual hair. Sometimes the hair-bulb fails to yield this supply of pigment, and the consequence is that there are on the same hair spaces that are alternately colored and uncolored. Sometimes the pigment fails utterly and finally, and then the hair blanches, and is sometimes of so dead a white, instead of being of a grayish or silvery white, as to be unhandsome. There are two other phases in the appearance of pigmentary loss in the hair, one of which is extremely unsightly, and the other quite the opposite. The first is that in which the hair, in losing pigment, becomes of a greenish, sea-weed tint. The other is that in which the hair preserves so small a trace of green as to be scarcely recognizable, save as softening and refining the effect of its whiteness.

In view of the beautifying effect of white hair, it is extraordinary how many persons as they grow old are blind to the fact. In Marie Antoinette's time it was accepted and utilized. Even the youthful face looks more youthful still with powdered hair; every fancy-ball proclaims the fact. It is strange, therefore, that, despite the fact, men of a certain age will persist in dyeing their hair and beards to look like blacking-brushes, and women of an uncertain age make it appear most certain by

donning black "fronts" as rigid as the coiffure of the damsel that often serves as a ship's figure-head. There are plenty of grayish and white "fronts" that would make a most gracious substitute by softening every facial line.

What makes hair curl? The curling-tongs, for one thing; crimping-papers, for another. We have heard it stated that a glass of good whisky has the same effect, but our observation goes to the contrary, that its tendency is to produce elf-locks. When hair does not curl, when it is perfectly straight, like that of the Indian, it is because the cross-sections of the individual hairs, forming collectively the head of hair, are broad ovals in form, approaching in shape the cross-section of a cylinder, which is a circle. When hair curls to the extreme possible, as in the Negro, with whom it is even kinky, it is because the individual hair is in shape very far removed indeed from that of a cylinder. It is flattened in places and distorted throughout its length. Take any hair that lies out straight, and pull it, while tightly compressed, through between the thumb-nail and the end of the forefinger, and it will be found instantly curled. One side of it has by the operation been shortened as compared with the other side. It therefore curls toward the compressed side.

The curling-tongs, by means of their heat, contract one side of the hair, and it consequently curls toward that side. The crimping-paper crowds the cells of the hair together on one side as compared with the other side, and as the hair is elastic it yields to the stress, and curls toward the crimping-paper, but upon being released gradually regains through its elasticity its old form. The heat from constant use of the curling-tongs permanently injures the hair by destroying its elasticity and rendering it dry and friable. The oily matter pervading the hair-shaft is dissipated, the cuticle of the hair is injured, and its natural lustre departs. Crimping-papers do no harm, except to the eyes of spectators. Girls who spend their nights and days in them

look forlorn for the most of their time, for the sake of an evening flitting, passing their existence in a pupa state, to emerge as an unnatural butterfly ; for, do what one will, the curls of nature defy imitation.

Except in the outer root-sheath of the hair, and then only to a very limited extent, has the presence of nerves as associated with the hair been demonstrated. Of course, the constitution of hair excludes the idea of its having any circulation analogous to that of the body. And yet there are certain facts connected with abnormal blanching of the hair, which indicate that, through cerebral excitement, and through other causes also, certain chemical changes taking place at their roots may pervade hairs to their tips, and change their color within a few hours. Putting aside the oft-cited cases of Sir Thomas Moore, Mary Queen of Scots, and Marie Antoinette, as having been so often mentioned as to produce the impression that there are no others, and equally discarding Byron's mention in poetry, which is fiction, of the Prisoner of Chillon, whose hair blanched in a single night, we will cite other cases leading to the conclusion that the phenomenon is possible, has occurred, and therefore is liable to occur again. Medical men are divided in opinion as to its possibility, but we are of the opinion of those who think that blanching of the hair, induced by some chemical change, the character of which is unknown to us, may occur within a few hours.

First of all should be noted the fact, if it be a fact, that sudden change in the color of the hair is not always from dark to white, but that cases are on record where the hair has turned from white to black, and from blond to red.

Dr. Erasmus Wilson, upon the authority of a correspondent of the *London Times*, cites the case of John Libery, who attempted to assassinate the Emperor Francis Joseph, of Austria, to the effect that when, a week after his attempted crime, he was led to execution, he was hardly recognizable from the circum-

stance that his previously black hair had become almost snowy white. The change was said to have occurred within forty-eight hours. Whether we suppose his hair to have previously been naturally black, or artificially black, a change from either condition could have proceeded from no other cause than a chemical one. Dr. Wilson supposes, from his own microscopic examination of the white spaces in partially and irregularly blanched hair (air seeming at those points to occupy nearly the whole of the air-shaft), that the presence of the gaseous matter there masks the color, and that saturation of the hair in oil might, by expelling the gaseous matter, have the effect of restoring the color of the hair.

But, if the pigment remains, as it is admitted still to remain, by the statement that its color is probably masked, how can its color be masked by air or any other gas? Air is air; we see through it; and we see through other gases. Gaseous matter, so disposed as he describes in the vacuoles of the hair-shaft, would, through the influence of light, have the effect of modifying the color, not that of masking it to the extent of obliterating it to the sight. Either the pigment has lost its color, or the pigment, as matter originally containing color, has disappeared; there is no other alternative. The last proposition is untenable, because the matter containing pigment, the granules regardless of their color, are physical existences, retained by the cuticle of the hair with a tenacity which we must believe sufficient to keep them under some form of matter from escaping.

We are therefore forced to conclude that the granules have lost their color. The coincident presence of gaseous matter in the hair-shaft, in such abnormal quantities as apparently to occupy nearly the whole contents of it, offers a very important suggestion to the mind, which we will venture to set forth as the true explanation of the phenomenon under consideration.

Is it probable, we ask ourselves, is it indeed credible, that this

gaseous matter comes from the atmosphere; that it is ordinary air? If this inordinate amount of gaseous matter be atmospheric air, it must come from the inside or outside. But it cannot come from the inside, because the hair-shaft is directly connected in the follicle with the hair-root from which it rises, and it cannot come suddenly from the outside, because the horny cuticle of the hair cannot suddenly change, and the contents of the hair-shaft are so compact that it requires strong chemical measures (which we shall describe in the next chapter) seriously to disturb them. The tendency of the contents of the hair-shaft is to outflow instead of to inflow, as we see demonstrated by the shriveling of the hair during severe sickness and disease.

We are therefore driven to believe that we are not concerned with atmospheric air at all, but that the gaseous matter inside of the hair-shaft is liberated by a chemical change which has simultaneously divested the pigment-granules of color, and perhaps wholly converted them into a gaseous product. We believe, in a word, that the loss of pigment-color and the presence of gaseous matter are related, concomitant conditions of the same phenomenon. Upon this theory, the sequence of events would be, that great disturbance of the nervous system, whether primarily mental or physical, having occasioned abnormal and destructive secretions in the generative apparatus of the hair at the root, capillary attraction has conveyed them through the hair and thus destroyed its coloring matter, coincidently with liberating gas formed as one of the products of the chemical reaction.

The views here expressed are strongly confirmed by the circumstances of a case reported in the *Medical Times* of July 2, 1881, since republished in the *Journal of the American Medical Association*, December 21, 1889, and noticed by the *London Lancet*. In this case, through the hypodermic administration of pilocarpine, the hair changed entirely in the quantity and

quality of coloring matter. Twelve days after the beginning of the treatment, the light-blond hair of the patient, a woman, began to darken, and continued so to do until by the twenty-sixth day it had become dark brown, and, although at the end of seven weeks the administration of the pilocarpine ceased, the hair at the end of four months had become nearly jet black. It subsequently reverted to brown. No change of structure in the hair was observable through microscopical examination. The only change detected in it was thickening and increase of pigment. Here we have, in a surcharge of pigment, the reverse of the cause of blanching.

A case is also known where the fluid extract of jaborandi produced similar results. Dr. D. W. Prentiss, the original observer in these cases, gives in his article on the subject, in the *Journal of the American Medical Association*, many interesting cases of change of color in hair.

A credible medical witness has reported a case of violent neuralgia treated with morphia, bromide of potassium, quinine, etc., followed by discoloration of the hair, some of it becoming white and some red, while at the back and sides of the head the normal black tint of the hair remained. Sir James Paget tells, in one of his lectures, of the case of a lady whose hair, during attacks of nervous headache, whitened in places, and in a few days afterward regained its color.

All that we have personally been able to glean on the subject seems to warrant the conclusion that hair may change suddenly from natural or artificial causes, through systemic agency, despite the fact that the hair proper has no nerves and no determinate circulation, that it does occasionally so change, and that it so changes through chemical, combined with capillary, action.

Klein is justly regarded as a high authority on the subject of the hair, but we cannot agree with him on one point, that if

a papilla be destroyed it is reproduced. He says that, in the case of the destruction of a papilla of a hair, a new papilla and a new hair are generated in the old follicle. The process, according to him, is the following. When the papilla atrophies, its hair-bulb and the lower part of the follicle degenerate and are gradually absorbed, and then, when nothing is left of the apparatus but the upper part of the follicle and the hair-root, a growth of cells pushes downward from the outer root-sheath and becomes invaginated over a new papilla. But where does the new papilla come from? A new papilla is thus assumed to have formed. But we have one cogent and sufficient reason to oppose to the idea that a new papilla can form in case the old one has actually been destroyed, and that is that, when by the needle we extirpate a hair by passing an electric current through the papilla, no hair is ever reproduced from the follicle. It is a legitimate presumption that no papilla is there to reproduce it.

When a hair, exhausted as to the vitality of its root, perhaps from the root being called upon to maintain a stem too long for its capacity to nourish, the root shrivels, and the root, with the hair, slips from its follicle, leaving the papilla to reproduce another hair, as it assuredly will do, unless the case be one of incipient baldness. The follicle remains as the vital point, fully equal to producing another hair. When we pull from the head a live, vigorous hair, we do not find the root shriveled, but looking like a dense gelatinous mass, ragged at the extremity and sides. This is the root with a portion of the inner root-sheath clinging to it. The reader will remember that we said that the inner root-sheath extends only from the neck of the follicle nearly, but not quite, to its bottom, and closely invests the root. Hence, when the root is exuberant with vitality and bulges out in every direction in its follicle, instead of being overtaxed to support too long a shaft, or dwindled from disease, it is in such close contact with the inner root-sheath, that in

pulling out a vigorous hair we must needs pull out part of the inner root-sheath with it. In neither case, however, is the papilla removed or destroyed, and it at once begins to generate a new hair.

A new hair is pointed, and in making its way out of the narrow neck of the follicle it is bent around like a loop upon itself, in which form its ability to escape is much increased. Nevertheless, hairs do sometimes become involved in the follicle so that they cannot escape, and continue to grow in a spiral form until the irritation to the skin becomes so intense that they must be liberated by its perforation.

Baldness, whether premature or mature, as in old age, and also baldness from disease, is caused by the absorption of the structures which represent the mechanism of the growth of the hair. Baldness may be physiological or pathological; from natural weakness of the structures and cessation of their functions, or from disease constitutional or acquired.

Congenital baldness can be but retarded in its devastation, and, probably, best by means of the stimulation of the galvanic current. For this particular application of the current, there is now manufactured an admirably constructed brush, with light, springy steel wires, taking the place of bristles. So far from being harsh to the scalp, the sensation produced by it without the current is delightful. With the addition of the light current used for the scalp, the sensation undergoes, of course, the change natural to the electrical flow.

Congenital baldness being, as every one knows, frequently associated with great general vitality, tonic and constitutional treatment is not indicated for persons suffering from its inroads. When, however, the tendency to loss of hair originates otherwise, whether in children or adults, constitutional treatment should be adopted coincidently with local treatment of the scalp.

Dandruff is a perfectly normal product. It represents scales of the horny layer of the scarf-skin, both those pushed out of the follicles by the growing hair, and those fallen from the surface of the scalp of the head. The scales of the horny layer of the scarf-skin are constantly falling from all parts of the body, but the fact does not attract general observation, as it does on the scalp, because their fall is not arrested as it is by the presence of long hairs like those of the scalp. In healthy persons, especially in the cases of those whose hair grows fast, the formation of dandruff is naturally the most rapid. Beyond the natural, healthy condition described, we reach the oily scaliness of seborrhœa and other diseases. Fuller mention of affections of the skin causing baldness properly belongs to a chapter in which we shall discuss the diseases and parasitic invasions of the hair; so we reserve it for that place.



CHAPTER XXV.

THE COSMETIC CARE AND TREATMENT OF THE HAIR.

THE hair, at the first glance, seems to be virtually independent of the body, to be a growth which manifests vigor or weakness, irrespective of vigor or weakness of bodily constitution. We sometimes see young, lusty members of society bald at an early age, and the consumptive often endowed with marvelous luxuriance of hair. Yet this independence is, after all, but seeming. We know next to nothing of the delicate processes of vital chemistry, but, little as we know, we know this, that the growth of hair depends primarily upon nerve-supply and circulation in the scalp, and therefore that a man endowed with superb general health may become bald, while, at least for a time, the hair of the consumptive may flourish. The health of the hair of the consumptive, as deduced from its appearance of luxuriance, is only seeming. Consumption is a consuming of tissues and coincident death of structures. In its earliest stages it often presents many signs similar to those of health,—high hope, appetite, color, muscularity,—because the vital action is spendthrift. The outgo is more than the income; it is not drawing upon the interest of constitution, for there is none, but upon the little principal that it possesses. But later, the hair shares in the general decadence. It begins to fall out, what is left to become dry and shriveled, and in the last stages of the disease, if they last long enough, the sparse remainder gives no idea of its pristine luxuriance and beauty. The nerves of the scalp and all the apparatus depending on them are atrophying and, like the body, will soon be dead.

The first, last, single, fundamental fact that we would strive to impress upon the reader, regarding the growth of the hair, is

that, however much it may vary in the individual on account of constitution, sex, age, or climate, it depends in all persons upon the character of individual hair-producing nervous and vascular organization of the scalp. Whatever, therefore, whether in kind or duration of covering for the head, in cleanliness of the part, friction to it, stimulating lotions, contributes to keeping the scalp in a healthy condition, promotes also the growth and duration of the hair.

The scalp should not be regarded as skin, otherwise than at least as susceptible as that of the body, liable from the same causes to experience good or ill effects; for it has the same constitution as that of the rest of the body, with the relative disadvantage of not being heavily re-inforced by tissues below. Coincidentally, another fact should be kept in mind, that general rules apply only to mankind in general, that often what is permissible to one person is impossible to another. The amount of neglect which, in the shock head-of-hair of an Italian organ-grinder's boy, gifted through race, and spending most of his time in the open air, has no apparent effect, would mar or ruin the hair of a home-abiding woman. With him every nerve in the scalp is in vigorous action, every gland secreting, despite neglect of cleanliness. He is living almost in a state of nature, the woman almost as far as possible from it. Who has never observed, who has been away on a ramble on sea-shore or mountain, how much faster there than elsewhere the hair grows from the effects of air and exercise under the open sky!

It follows that certain practices of some persons, in the care and treatment of the hair, are impossible to others. People generally forget that they are not living in a state of nature, but, on the contrary, in a highly artificial one, and, therefore, that what, in a state of nature, nature would tolerate as divergent, it is ruthless with regard to in departure from or violation of its laws. To a certain degree it will accommodate itself to the special

needs of every individual, but beyond that the bond between it and the individual becomes strained, and often parts with life itself. Everywhere human beings need light and air and cleanliness for health and life itself, but they seem to forget, if they ever knew, that the hair, being a vital structure, needs, like the body elsewhere, light, air, and cleanliness. It especially needs attention to them in the midst of the artificial life of civilization, for, in a state of nature, the hair obtains the first two so plentifully that it can even afford to dispense largely with the last. With regard to light and air, we have, however, made some advance in practice, as the flowing locks of girls up to fourteen years of age show. We much fear, however, that the practice originates with fashion, and not from recognition of the fact that we have mentioned.

Civilization is especially mindful of the need of cleanliness for the hair, while apparently oblivious of its demand for air and light. But, while practicing the cleanliness to which it is largely addicted, it often pursues methods which are detrimental, and sometimes fatal, to its chief end in view. We can favorably influence the condition of the hair-secreting apparatus only by means of maintaining or increasing the healthy action of the scalp. By nourishing and stimulating to reaction the secreting structures, they are kept in healthy condition, and their productive energy increased. We shall attempt to show that some of the practices contemplating these results are, instead of being beneficial, highly pernicious.

One of the most flagrantly wrong methods is severe combing with the fine-tooth comb, and severe brushing with the stiff-bristled hair-brush. The epidermis and corium of the scalp are not, as are the epidermis and corium of the body, supported by large masses of subcutaneous connective-tissue and fasciæ. The thickness of the scalp is very slight,—so thin that in some cases of baldness it presents the appearance of dry parchment

shrunk over every modeling of the skull. Realize the severity of the practice, as to this thin integument, of taking a hard brush (and sometimes one is used in each hand), and going through an Indian-club exercise on the head. Of course the skin there is unduly stimulated, because it is too thin there to stand the amount of friction from which elsewhere it would not suffer. A considerable amount of stress, too, is by this process put upon the roots of the hair by the pull upon the hair-shafts. In the case of the abuse of the scalp by the fine-tooth comb, it is used like a harrow over the scalp, excoriating it so that the smallest amount of diluted spirits afterward applied to it causes painful smarting.

Yet both of these instruments are efficacious for cleanliness, and productive of no harm if judiciously employed. We once knew a gentleman who retained to an advanced age a full suit of hair, untouched in color and glossiness, who never failed daily to pass the fine-tooth comb through his hair. But then the operation consisted literally of passing it once through the hair, allowing it barely to touch the scalp. Thus he gathered on it a minute, almost imperceptible, fluffy film of dust and dandruff, and maintained the scalp in a state of perfect cleanliness, without exacerbating it to the slightest degree. He parted, and then brushed his hair, not as a gymnastic exercise, but simply as a gentleman quietly arranges it,—with a moderately hard brush, neither hard nor soft, imparting a gentle but sufficient stimulus to the scalp.

If one has one's hair only occasionally cleaned and combed by another person, the best mode of procedure is the following, in which also the fine-tooth comb bears its share:—

Some saponaceous matter, in liquid form, or made at the time from a cake of bland soap, is rubbed into suds on the head, the scalp being carefully gone over with the tips of the fingers and nails, to dislodge any adherent scarf-skin scales, and then

scalp and hair are washed by pouring water over them while the person being operated on stoops over a basin. The hair is then dried, preferably with hot towels, and such an amount of oil of some kind as may represent that lost by the operation, and, perhaps additionally needed, is administered to both scalp and hair.

Here the operation may cease, with this administration to the scalp especially, but in some degree also to the hair, of a small amount of oil or pomade as a substitute for that lost through the deterative effect of the soap, and, additionally, of an amount needed to rectify undue dryness of the scalp and hair. But if one contemplates having the operation completed to the ultimate point of nicety, then, after the head has been dried with hot-towels, the operator should take the smallest kind of a toilet-brush (that which in the brush part is only two or three inches long), and, carefully dividing the hair with it and a comb in places all over the scalp, look out for any remaining incrustations of scarf-skin, and gently remove them from the surface, not by a scratching, but by a gentle, spading movement. After this, some fine oil or pomade is rubbed into the scalp with the tips of the fingers, and the hair itself is given a sufficient allowance by receiving that which remains on the hand.

In an exceedingly rude way this operation is performed by barbers, and called by them shampooing. With them, it closes at the end of the first step just described, when they douche the customer's head through a quill in the cork of a bottle containing some compound of an oily, alcoholic nature, scented with such a vile odor that for hours afterward, when a man removes his hat in a public conveyance, or in the street, and finally returns to the bosom of his family, the whole world knows that he has been shampooed, and upon rising the next morning he finds that he has, although perhaps an educated man, made his mark upon his pillow. If one attempt to escape from the infliction of the pepper-sauce bottle, he does not fare much better, for the

ordinary barber never has a choice oil or pomade. The only truly sublimated barber's shop that we ever saw was one kept in San Francisco by a German named Edward Stahl. There a brush was never used a second time until it had been washed. Baskets of freshly-washed brushes, looking at a little distance like heaps of freshly-cut straw, were brought in at intervals throughout the day. The towels used were heated over horizontal cylinders of bright copper, within reach of the shampooer.

It will be recollected that we spoke of the moderate use of the brush on the head as imparting a gentle, pleasant, and beneficial stimulus to the scalp. There are, however, other desirable stimuli for the scalp which we are far from wishing to ignore. It is only the excessive use of stimuli for it, or the use of improper stimuli, that we condemn. Just as we verily believe that we have known men to promote baldness by severe brushing of the scalp with hard brushes, equally do we believe that other cases of baldness of which we know have been promoted by sluicing the head with all sorts of astringent and stimulating lotions. Most men and women, upon first taking alarm at the loss of hair as portending the immediate invasion of baldness, adopt remedial measures which are by far too energetic. They are generally addicted to too much brushing and combing and lotion-applying, and when we consider that the composition of some of the lotions is positively injurious, and that there may be excess in the use of those which are good, the usual event of more and more rapid loss of hair is not surprising.

There are about the growth of the hair certain fundamental facts that would seem to be so open to the commonest observation, that they would serve for guidance in the care and treatment of the hair. Indeed, there is a single one, generally accepted by women, which would seem to imply all the rest, as if they were mere corollaries of it. Thousands of women have been told and believe that, if they examine the ends of their

hair, and snip it off below the point where the hair-shaft seems impoverished, it is not so likely to fall out. Thousands of women follow this practice, but do not seem to see all the various facts which it implies, and consequently do not reap the benefit that could be derived from that knowledge.

The fact, for it is a fact, implies, first, that the root of the individual hair-shaft can nourish well just so much length of the shaft and no more than that represented by the length of the hair from the scalp to the beginning of the shriveled portion of the hair. It implies, secondly, that by cutting off the shriveled portion of the shaft, whatever small amount of nourishment it has been uselessly receiving, will be devoted to that portion of the shaft which is left. And through both of these statements it is implied that nutritive material proceeds along the hair-shaft from the root toward the end.

Now, the preceding fact and its implications lead surely to the broad, underlying fact of nature's agency in the matter. Every individual scalp is a soil. It is, first of all, a soil, as belonging to one of a race of mankind, one race being as to it endowed with greater fertility than another, and productive of a different kind of crop. It is, secondly, a soil, as belonging to an individual within a race, to that particular individual and to no other. And it is, lastly, even as to that individual, a soil variable in fertility, its capacity as to quantity and quality of crop differing with habits of life, health, and age.

No matter who that individual may be, one can no more make a hair grow sensibly longer than it naturally grows, than one can by taking thought increase one's stature by a cubit. We can make it grow thicker, but the thickness obtained is at the expense of even the former length, because there is just so much nutritive material to make it grow, and if we use it for thickness we cannot have it for length. Some time in the latter part of the fifties a man went through a portion of Maine, making

such plausible representations to the women and girls, that hundreds of them had their hair cut off at the nape of the neck. The hay-crop of Maine is justly celebrated, but it requires labor to reap and store it. Here was a swath cut through a crop of the State at the expense of flourishing a pair of shears. Dearly must some of the ancient virgins, who had not trimmed their lamps to enable them to see better, have rued their blindness to the fact that, after the loss of precious years, they had hardly reached the point from which they had started.

The very first thing that one should do when hair begins to fall freely from the follicles and presents a shriveled root, is not charingly to snip it off near the tips, but promptly to cut off a generous allowance at the ends. Therein lies the best chance to regain what is thus lost. Then, do not go to work to brush harshly and unceasingly, and to comb with unrelenting care, but perform both operations gently and occasionally, being careful to see that the scalp and hair are supplied with ample nutritive oily material. Avoid all cosmoline and vaseline preparations, which are derived from petroleum. Think you, that if nature had thought it best that coal-oil or any of its products would be best for the scalp and hair, that it would not have had spouting wells of petroleum on the head? Nature has declared in favor of sebum. Sebum, as we know, is a product like suet. It does not follow that we recommend only suet for the hair, although suet, nicely refined and scented, makes an excellent application for it. What we first of all define as our view is, that nothing prepared from petroleum should be used on the scalp and hair, and, going beyond that, we recommend as best for the hair, not even a vegetable oil, but an animal oil; because we believe that nature knows best about everything, and in this matter our experience confirms the ever-present wisdom of its ways. Vegetable oils for the scalp and hair may pass muster in health, simply to remove dryness, but for comprehensive utility, whether in health, weak-

ness, or disease of the scalp, commend us to the oil of nature's choosing, or the nearest imitations of it that we can make. Bear's grease, beef's marrow, almost any pure animal-oil that has been well tried-out and refined beyond the possibility of becoming rancid, is adapted to the scalp and hair. We have the remains of a pot of Coudray's pomatum that we have had for nine years, and it is still perfectly sweet, although it has been exposed to the heat of several very hot summers.

In all that has been said as to the use of oil or grease on the scalp and hair, it is not in the least implied that they are ever to be used for decorative purposes. Nothing is more indicative of barbarous and semi-civilized conditions than the use of oily matter for decoration. The more man becomes civilized, the more he shrinks from grease. There is a tribe of savages in South America whose members finish their toilet by placing on top of the head a pat of butter, which in the course of the day trickles down over the head. The purpose is protective against the scorching rays of the sun, but, as in the case of all dressing, it is doubtless regarded as decorative. In this very city, about the forties, when a man with a moustache could not be sure of passing through the streets without being hooted at, the fashion of hair in the hooter, who was known as Sykesey, his female congener being Lize, was cropped short behind, and at the temples hanging to the cheek-bones in two squared, black ears, called soap-locks, saturated with oil, while Lize was not far behind him in her greasy presentation of her sex.

Oil, or grease of any sort, then, is not to be understood as recommended for decorative purposes, but simply, so to speak, as a fertilizer; and the reason for which we recommend it as such is simply that of a wide experience, confirmatory of its necessity as representing obedience to the laws of nature. If it be said that nature, furnishing oil to the scalp and hair, must furnish it in sufficient quantities, we answer that observation

proves that this often is not the fact. The argument, in view of all the knowledge in our possession, is fallacious. If we were living in a state of nature, the argument would have more apparent force. But even then it would be futile, for, after all, what is nature? Not the perfectness of any living thing, but the sign and symbol in every living thing of tendency toward perfection. Nor is nature even thus limited, for around all living things is placed the bondage of circumstances, from which man can only partially escape, and this condition is a part of nature. If nature, as thus composed of life and circumstances, were to man all-sufficient for his welfare, then self-help and tendence of others would be folly, and the existence of the physician would be one of the most glaring absurdities in life.

The profession of women has been, for many years, that they use no oil at all on the head. Their abstention from the practice has not been so great as many of them imagine, for within that time there has been more use of hair-lotions and so-called tonics, all of which contain oil. But to whatever degree abstention, or belief in abstention, from the use of oil on the head has taken place, it has been brought about by the decree of fashion as to the dressing of the hair, and without the slightest thought of any connection between it and the hygienic condition of the scalp and hair. The fashion for the hair, however variable in individuals, has been averse to smoothness of arrangement, fluffiness and crinkiness to some degree being universally present in the coiffure. Our observation of the deadness of appearance in the hair of young girls and women, compared with its former relatively lustrous appearance, goes to show that this fashion, in largely leading to discontinuance of former methods of treating the scalp and hair, and to the adoption of plentiful alcoholic stimulating lotions, has brought the hair of members of the fair sex generally to a lower hygienic condition than the condition among corresponding classes, say thirty years ago.

Let us examine this question in the light shed by a comparison between the old practice and the new, with relation to their probable respective effects upon the hair.

We have learned that the hair, in becoming less vigorous, withers at the end. This shows that the forces which sustain it pass through it as through a capillary tube. We have learned, also, that in otherwise degenerating, the interior substance of the hair liberates a gas which may pervade it. In addition, it is known that the hair is hygroscopic; that is to say, that it will imbibe water. Upon the basis of this knowledge instruments, called hygrosopes, are made of hair, which imbibe the vapor of water in the atmosphere, and by an attached scale can show its relative humidity at different times. We also observe that the hair, from being immersed in water, becomes partially saturated, because we find that it then becomes much heavier, and in proportion to the time during which it has been immersed, takes a longer time to dry. In bleaching the hair, we find that potash and peroxide of hydrogen readily attack and change the character of the whole contents of the air-shaft. We find that, in weakness of constitution, and in certain diseases, the exposure of a large hair-surface is unfavorable to the patient's condition, and we cut off the hair. We find that, in paroxysms of acute insanity, the hair often bristles up over the whole head, and presents a peculiar appearance far beyond the possible elevating effect of the hair-erecting muscles at the roots.

These facts prove, over and over again, that the hair is a living tissue, that the individual hair-shaft, when in its normal, unmoistened condition, acts virtually as a tube, capable of exercising capillary attraction, and that, when moistened, the cells of its cuticle admit liquid at their joints, which, entering into the tissue, escapes, if water, by extremely slow evaporation.

The universal old-time practice of treating the scalp and

hair among people of condition was admirably adapted to this actual constitution of hair, of which, however, it should be said, they knew not a whit more than the present generation among the laity. The women who go about now cleaning hair have no more knowledge than the barber has of its constitution and growth. They often bring a lotion with them of their own composition. So every barber has one, frequently of his own composition. He calls it a tonic; so does she her compound. Neither knows anything of its therapeutic value, yet they both assume each to be of talismanic virtue. It is generally nothing but alcohol and almond, or some other oil, sometimes colored with cochineal, or otherwise tinted. If only of these ingredients, it is not objectionable if used only occasionally, and the alcohol be not too strong. We do not mention it as such, but merely as part of the account of the ordinary male or female hair-dresser's stock-in-trade in knowledge and material. Scientific practice must be based either directly or indirectly on scientific knowledge, and this they have not individually searched for and found, nor have they ever acquired it through instruction.

In the modern system of dressing the hair and cleaning the head alcoholic solutions are entirely too much used. They unnaturally dry both hair and scalp, and penetrate the cells of both to their permanent injury. That is, they do so if used in a concentrated alcoholic form, or if used constantly even when in a diluted alcoholic form. The first thing to be done in beginning the treatment of the scalp and hair is to examine the scalp for undue dryness, and the hair for withered roots and lustreless shafts. Then one becomes possessed of facts to work upon. The hair being, as we have mentioned, a living tissue, shows at once if it be unhealthy. If any one should say, how does it happen then, that hair long shorn from the head retains its beauty? we answer that it retains its beauty if it possessed

beauty when so shorn, because its beauty then became embalmed. On the living body, one of the differences between healthy and unhealthy hair, the one most open to casual observation, is precisely difference in beauty. Dead hair never can regain it, but for the still-living hair there is hope with life.

Pluck some hairs out on different portions of the head. Are the shafts irregularly tinted and shrunken? Are the roots shriveled and withered, instead of being full and bright, like pieces of moist gelatin? If these are the conditions present, trim as you would a plant under cultivation, not limited as you are in the case of the plant to any season of the year. Trim the hair gradually at the ends, watching at the roots the effect in newly-grown hair, and along the shafts of both old and new hair. Administer bland oil in extremely small quantities, but frequently, to the scalp for the nourishment of it and the roots of the hair. By fertilizing the soil and trimming, admit that one cannot expect a weakly plant to be umbrageous. If there is any chance that it shall ever be, you are securing it by these precautions. Under Providence we do what we may, not what we wish.

The hair, being a living tissue, and being very long as worn on the head of members of the fair sex, offers excellent opportunity for healthful stimulation along its shaft, as well as at its root. No lady of the olden time but knew that the hair, manipulated by passing the hand over it as it lies smoothed out on the head, or passing the long masses of chévelure through the hand, is improved in glossiness. It is not to be for a moment supposed that the hair is thus rendered glossy, save as a secondary consequence of this treatment. The primary consequence is the healthy condition of the hair-shaft. The hair-shaft, thus treated, secretes and excretes, as well as absorbs. The mild friction of the somewhat similarly constituted skin of the palm of the hand removes from the hair-shafts minute, clinging particles, commu-

nicates warmth from friction, stimulates nutrition, and its consequent secretion and excretion, and polishes the rounding surfaces to exquisite finish, revealing and enhancing all the nuances and undertones of color in the hair.

When the hair, as smoothed out on the scalp, is subjected to this process, the best way to carry it out is to pass the hand and the softest kind of a brush alternately over the surface. The effect is as different from that of crudely oiling as is that of night from day. Oil should be used merely to supply a deficiency in oil-production. If there be no deficiency at all, which is a doubtful condition in our very artificial mode of life, then it were needless to say that the use of oil would be monstrous. It is, however, our conviction that, our lives being what they are, as to exercise, housing, furnace-heating, etc., there is no one so living who, at least in the winter time, is not deficient in oily secretion from the scalp. Upon the basis of these facts, as detailed, it is for the judicious to employ oil with discretion, with the view of supplying a deficiency in a substance upon which the health and beauty of the hair depend.

We conclude this branch of our subject with a summary of the advice which we would wish to impress regarding the treatment of the hair. All stress put upon the roots of the hair, whether by twisting its shafts in dressing it, so as unduly to pull upon the roots, or so brushing it as unduly to pull upon them, is detrimental to the health and the growth of the hair. Equally detrimental to it is exacerbation of the scalp from harsh mechanical treatment of it with the comb and brush, or frequent use on it of strong alcoholic solutions. All preparations of cosmoline and vaseline should be tabooed, because they are mineral-oil products. Great care should be exercised to avoid letting the hair grow so long as to become impoverished by its dropping out, or by the withering of the hair-shaft, conditions sometimes coincident in time. Remembering that on poor soil one cannot

raise a good crop, be careful to supply artificially to the scalp and hair the amount of oil by which it is naturally, or you have artificially rendered it, deficient. Remembering, too, that nature's growths need air and light and moisture, fail not to let the hair have all these. Thus, and thus only, if it be otherwise possible, can one secure health and beauty to the hair, and avoid, or at least postpone, the evil day of baldness, if perchance it threatens invasion.

We have admitted that we approve of an occasional mild stimulation of the nervous and vascular systems of the scalp by the mechanical means of the brush, or by some properly medicated fluid; but we have been careful to say, at the same time, that any stimulation of the scalp must be only occasional and mild, and that when it is a stimulating fluid that is used for the purpose we should be very careful as to its chemical composition. We have no faith in a strong solution of alcohol being beneficial to either scalp or hair. The very fact that it so efficiently cleanses them is one of the proofs of how severe the application is. The question as to its use or abuse, however, really turns upon the question as to how much the alcohol is diluted. If it could ever be used perfectly pure, and were so used, it would doubtless kill outright many a hair-root. But alcohol has such an affinity for moisture, that what is called absolute alcohol, or perfectly-pure alcohol, has but a very brief existence. Then, again, the alcohol, as actually used for lotions, has been purposely diluted with watery fluids, besides having matter in solution. All this being admitted, alcoholic solutions, as used for the hair and scalp, are very frequently, perhaps for the most part, too strong.

Alcohol is drying to the scalp, and to every part of the hair-shaft that it touches. This happens because it takes up the natural and artificial oils in solution. And that is why it cleanses so thoroughly, because in taking the oils into solution it liberates

the dirt entangled with them, and this the final application of water removes. But what is the condition of the hair after a bath of alcoholic solution? Excessively dry, requiring ample restitution of oil, if serious detriment to its health and growth is to be avoided. The same consequence, in a greater degree, follows the use of borax on the scalp and hair, and after the use of it there should be an ample restitution of oil.

We are strongly of the opinion that, although for occasional use light mechanical friction and mild lotions are all that are desirable for the hair and maintenance of the health of the scalp, that when it comes to cases of incipient loss of hair, threatening baldness, it will be eventually recognized that no stimulus for the scalp, and, through it, for its nervous and vascular systems, upon which, as we have said, health and growth of hair primarily depend, can compare with that of the galvanic current mildly administered. Its tonic effect is so remarkable that, if it be possible to abort a case of baldness, the best means for so doing lie there. With moistened sponge-electrodes, the hair too being moistened and parted at intervals, the application can easily be made to the scalp. A very good way of administering the current is with the metallic-bristled brush, of which we have spoken. The galvanic current forms real, effective administration of electricity. The brushes that are offered, and, we regret to say, too, are bought by a portion of the public, have a little magnet inside of them, and possess no electrical power whatever, nor any magnetic power either, so far as affecting the animal body is concerned. Their attraction is exercised solely on iron or steel and the public gullibility.

The presence of hair abnormally, with reference to position on the body, or to sex, is a real affliction, in cases in the female sex occasionally reaching a point embittering life. *New Remedies*, of October, 1883, gives the following formula for a depilatory :—

Sprinkle over 100 parts of good quick-lime about 50 parts of hot water, and, when slaked, triturate [shake up] with 200 parts of cold water. Place in a suitable flask, and pass into it the hydrogen sulphide, generated from 200 parts of sulphide of iron and 200 parts of sulphuric acid, gradually introduced into the generator. This preparation must be immediately placed in small vials and securely sealed; but even then it will lose its virtues after a few weeks. This was originally recommended by Brëtger, but is sometimes known as Martin's Depilatory. This paste is to be spread over the hairy skin to the thickness of $\frac{1}{8}$ inch, and allowed to remain for ten minutes, when it is removed with a wet sponge. When allowed to remain too long, bad sores are apt to result.

Another, known by the Turkish name, Rusma, is composed of 50 parts of quick-lime, 30 parts of starch, and 5 parts of orpiment. This is to be made into a paste with water, and employed in the same manner as the foregoing.

Of course these, and all such methods, remove hairs only temporarily. One of the incidental and dreadful phases of abnormal hair is the tenacity of its growth. What might seriously affect a surface of healthy hair, does not seem to influence the obtrusive growth in the least. Our imaginations, however, are somewhat concerned in this impression, but only to the extent of exaggerating it to the mind, for abnormal growths have doubtless wonderful relative vigor. The only way of making complete and final disposition of abnormal hair, without marring the beauty of the skin, is by what is known as epilation by the electric needle. This is a very trifling operation, so far as hurt is concerned. A very fine platinum needle is inserted in the papilla of the hair, and then, a small galvanic current from the negative pole being turned on, the papilla is instantly destroyed, and the reproduction of hair from it, of course, rendered impossible.

The following recipes are for washes, regarded as excellent for stimulating the scalp in case of gradual loss of hair:—

1. Lanolin, 1 ounce.
Bicarbonate of sodium, 1 drachm.
Mix, and rub once a week over the scalp in a single application.
2. Corrosive sublimate, 15 grains.
Turtle-oil, 6 ounces.
Mix, and use as a hair-oil.

One of the best of hair-tonics is Pinaud's Eau de Quinine. In a later chapter we will give a list of some of the more elegant preparations for the toilette.

Oxygen, as is well known, is one of the constituents of water. But water may contain a much greater proportion of oxygen than is necessary for its constitution. Binoxide, or peroxide of hydrogen, contains a very much larger amount of oxygen than water in nature does. In this form it is sometimes called oxygenated water, and is a highly oxidizing fluid. This it is which, in the modern practice of bleaching the hair, has superseded the use of potash for the same purpose. The following formula for its preparation was, in April, 1884, given by the *American Druggist*:—

The hairs should be digested with a 3-per-cent. solution of carbonate of ammonium, at 30° C. (86° Fah.) for twelve hours, then treated with soap-suds, and finally again digested with the solution of carbonate of ammonium. When thoroughly washed, they are placed in peroxide of hydrogen, which should previously be perfectly neutralized with ammonia.

"Digested" means, in this case, simply "soaked in." As one could not literally keep the hair in soak for twelve hours, what is meant is that the hair is kept saturated by wet cloths.

Peroxide of hydrogen produces in the hair an effect which is a travesty of any tint that nature makes in the hair of the blonde. It is a mystery how any one can imagine that it simulates even the lowest order of that kind of hair, which in its lowest natural estate is far from handsome, while it rises at its highest to a beauty not to be exceeded. The peroxide blond hair has a singularly dull, lifeless cast of yellow, so flagrantly unnatural, that a glance at it as it passes in the street is enough to detect it. The hair-substance has, by the use of potent chemicals upon it, ceased to be a living tissue, and is lustrelessly and obtrusively defunct and wiggy.

CHAPTER XXVI.

PARASITIC INVASIONS OF THE SCALP, HAIR, AND BODY.

ANY cutaneous affection is necessarily aggravated by the presence of hair on the area involved. We can cite such a case, even when a large boil, occurring under the chin, amidst the thickest of the growth of a dense beard, was especially troublesome on account of its occupying that locality. There are, however, affections of the skin which are distinctively associated with localities where there is a growth of hair, and one affection, eczema, or tetter, to which there is marked liability as a consequence of some depraved condition of the hair-producing functions. When tinea or seborrhœa are the diseases concerned, they, although having a wider range than merely attacking the hair-producing apparatus, may be distinctively diseases of the scalp and other hairy portions of the body.

Tinea sycosis, or barber's itch, is a vegetable parasitic affection, to which only members of the male sex are liable, because it attacks only the bearded parts of the face and neck.

Tinea circinata, or ringworm of the body, caused by the same vegetable parasite, does not by predilection attack hairy surfaces. When it spreads to them from other parts that have been attacked, the affection is known as tinea tonsurans, or hair-denuding tinea, and the disease becomes modified in character.

Tinea favosa, crusted, or honey-comb ringworm, is derived from another vegetable parasite. It may be circumscribed to one locality, and may invade the whole body.

One form of tinea, alluded to in a preceding chapter, attacks the nails. The disease in its various forms is very contagious. Ringworm of the scalp sometimes runs through a large school from the contagion of a single pupil.

Seborrhœa capitis, or degeneration of the sebaceous apparatus of the scalp, results in an oily exudation poured out on the head and mixed with scales of scarf-skin, forming unsightly and disgusting crusts on the head. As seborrhœa is a disease of the sebaceous glands, it may occur on any part of the body, and in rare cases has involved the whole of it.

Eczema capitis, or eczema of the scalp, may be a primary or a secondary disease of the scalp. As already indicated, it may be brought about by irritation of the scalp from some other disease.

With this brief mention of facts related to some diseases of the scalp, we must stop. It would be preposterous, even if it were right, for us to attempt to present even the briefest outline of such diseases and the treatment applicable to them. As a regular physician, we are opposed to the laity's attempting to treat themselves medically. We therefore conclude this branch of our subject by recommending that, for any cutaneous affection, recourse should be had to a good physician. Neglected diseases of the skin make firm lodgment. The skin acquires the habit of the disease, and through it the body becomes systemically affected. Frequently, the trouble is centred in the trophic system, and constitutional as well as local treatment for the affection is indicated, neither of which offices can any one but a physician rationally prescribe.

We will now pass from the consideration of vegetable to that of animal parasites.

It is a singular fact in the natural history of man, or rather of woman, that woman bears better the reality of a disagreeable thing than hearing mention of it. In our travels we have never met an exception to the rule, that the landlady who says that she never had a bed-bug in the house has plenty of them; nor of the converse rule, that if the landlady judges that it is within the bounds of possibility that she might have such a visitation

she is among the least likely of human beings to suffer from the pest. One kind of woman expects no special immunity that her equally worthy neighbors cannot enjoy; the other takes it for granted that all will go well of itself in this best of all possible worlds. One searches, and finds, if there be aught to find, and, finding or not finding, rests in blessed contentment that for some time to come nothing can be found. The other searches not, but lays the sweet unction to her soul that she is not as other women are, but lives under a special Providence. When we once saw a dame so well-assured, descanting on the natural immaculateness of her house, while all the time the very insect, witness for the plaintiff, was crawling, in plain sight to everybody else, along the edge of her spring-bonnet, we could heartily exclaim with Puck, "What fools these mortals be!" Weismann mentions, in one of the appendices to his work "On Heredity," by way of illustrating the tenacity of the life of bed-bugs, that "they can endure starvation for an astonishingly long period, and can survive the most intense cold. Leunis ("Zoologie," p. 659) mentions the case of a female which was shut up in a box and forgotten; after six months' starvation it was found, not only alive, but surrounded by a circle of lively young ones. Göze found bugs in the hangings of an old bed which had not been used for six years; 'they appeared like white paper.' I have myself observed a similar case, in which the starving animals were quite transparent."

Anywhere, at any time, however innocent we may be of neglect, we may have parasites brought to us abroad, or introduced into our very domiciles. Horrible to us as may be the thought, the horror of it can serve no good purpose but to put us on our guard and keep us ever on the alert to repel invasion. The contamination may be received in public indoor-places, in hacks, in cars, or may enter our houses in freshly-laundried clothes. We knew a gentleman who, once taking a

berth in a dirty schooner, in lieu of the state-room which he had expected to have aboard of a steamboat which broke her shaft, found the next morning that his person had been disagreeably invaded. It is by recognizing, no matter who we are, that we belong to the mass of humanity, and that, take what pains we will, we are still liable to its ills, that we incur through life the fewest of them.

Scabies, or the itch, comes from an animal parasite, called *acarus scabiei*. Even the great Napoleon once contracted this disease from grasping the rammer of a cannoneer who was suffering from the affection. During the late war it was very prevalent in places, from the inevitable massing of men at times in crowded quarters, amidst unhygienic surroundings.

There are three species of lice with which the human body is liable to be infested. These are, *pediculus capitis* (the head-louse); *pediculus corporis* (the body-louse); and *pediculus pubis* (the louse of the pubic regions).

The *pediculus capitis* is found frequently among unclean and badly-nourished children, whence it may extend its inroads to children of a very different condition. Uncleanliness among certain classes, even when the presence of the parasite is not indicative of a low tone of the system, amounting to disease, is a prolific source of contamination. Mothers, therefore, introducing into their families nurse-girls who have come from inferior surroundings, would do well always to see to their condition and personal habits.

The *pediculus corporis* is to be found chiefly on those persons who are of habitually unclean habits, or who have no opportunity, through being herded together as prisoners or slaves, to follow their natural habits of cleanliness.

The *pediculus pubis* (otherwise called the crab-louse) is much larger than either of the species mentioned, and is sometimes communicated in the manner already incidentally noted.

The treatment of these affections naturally begins by getting rid of the parasites and their eggs, or nits, as they are usually called. They have sometimes, before this can be accomplished, poisoned the skin to so great a degree as to originate cutaneous disorders.

Added to the use of the comb for removing the parasites, the following substances are usefully employed for the same purpose: Naphthol, mercurial ointment, tobacco, cocculus-indicus, staphisagria, sabadilla, pyrethrum, carbolic acid, and sulphur. These can be procured in the form of powders, lotions, and ointments, and some in that of soaps. Naphthol and corrosive-sublimate soaps are well adapted to the cleanly removal of the parasites. Pure naphthol and pure kerosene are too inflammable and malodorous to be recommended as applications. If used, they should be rendered less dangerous, and less offensive to the smell, by mixing with them some olive-oil. Soda, borax, vinegar, alcohol, and dilute acetic acid are useful for destroying the nits.

As, apart from an invasion of these parasites, a low tone of the system, induced by poor and insufficient diet, bad ventilation, and other unhygienic conditions, is provocative of their onset, constituting under the circumstances a true disease, it is necessary in such cases that the sufferer should be invigorated by tonics, at the same time that all depressant influences are removed.

If eczema, or tetter, has supervened from the attacks of the pediculus capitis, it should be treated by a physician. In our own medical work on diseases of the skin we have given much instruction and many prescriptions for the treatment of these parasitic affections when they amount to a disease, but as they are, as we indicated at the beginning, of sufficient importance to require the direct advice of a physician, there would be no object in setting down here discussions and prescriptions relating to them, and intended only for the eye of the medical practitioner.

To get rid of bed-bugs in beds, floors, or wall-paper, the best course to pursue is to wash every few days the surface where the insects are supposed to be lodged with a solution of 1 or 2 drachms of either corrosive sublimate or naphthol to the pint of water. Such lotions are best applied to a bed with the tip of a feather, which instrument affords a flat side carrying a considerable amount of liquid, and at the same time a thin edge that will penetrate the smallest crack.

The itching left by the poison of the bed-bug can be allayed by a lotion composed of 4 ounces of camphor-water and $\frac{1}{2}$ drachm of powdered borax, or one composed of 2 to 4 grains of corrosive sublimate to the ounce of water. Another soothing lotion for the same purpose is compounded of a drachm of boracic acid, or half a drachm of carbolic acid, to a pint of water.

The itching from the flea-bite is greatly relieved by alkaline lotions, or by a solution of either naphthol or corrosive sublimate and olive-oil.

The sand-flea, known also as the chigre and the jigger, is sometimes most annoying. Oil of wintergreen is somewhat of a preventive of the attack of this insect. The feet of children playing in the sand of the coast during the day should be examined as they are being undressed for bed at night, if they complain of any itching of the parts, for these are the favorite points of attack of the insect.

The tick, which varies greatly in size in different species, ranging from that of a grain of pepper to that of a large fly, quietly burrows into the skin in such a way as not to inflict pain, but with the eventual result of producing a sore. The best way to get rid of these insects is to have the spots where they have entered touched with a drop of oil. This excludes the air, and the insects are obliged literally to back out. In parts of the country, at certain seasons of the year, a day in the woods is inevitably followed by a profuse peppering of the back with

the species of tick known from its minute size as the seed-tick. Instinct teaches the animals where the most inaccessible parts of the body are. If another person will, under these circumstances, apply the oil, as just directed, the invaders are soon brought to retreat. Another mode of repelling their attack is to apply tobacco-juice, turpentine, or benzine to the part attacked, any of which applications will compel the insects to withdraw from the skin. Never break one of the larger species, previously mentioned, off in the skin, for that action is always followed by a festering sore, which, although minute, is annoying.

There seems to be no place on the habitable globe free from mosquitoes. At certain seasons, at certain times of day, they swarm even in Alaska, and are observed in equally high latitudes elsewhere. They are the greatest pest of America. We have been in parts of the country where the inhabitants habitually spent their evenings with their heads over a burning smudge of some sort to keep off the attacks of these relentless enemies of man and beast. In consequence of their attacks, life is in some places really not worth living, which is a deplorable state of things, when we remember that no saint ever lived in a mosquito country. When a mosquito is in good health and vigorous, nothing deters it but death from having drink. Die though it inevitably does from the *mania a potu*, example is of no effect, and all attempts to restrict it by pennyroyal or prohibition are in vain; it will have nothing but high license. The net is the only available thing for the mosquito; that is, the world for the mosquito, and the net for mankind. But, if you have been stung, that is another thing; ammonia-water, peppermint-water, spirits of camphor, or lotions made of borax, naphthol, or corrosive sublimate are good for relieving the irritation caused by the sting, and it is often promptly relieved by a lotion composed of a drachm or two of boracic acid to 4 ounces of peppermint- or camphor-water.

Next to the mosquito, and in some countries before the mosquito, the flea ranks as the most relentless foe of man. In Italy how many travelers have not bewailed their lot in their unhappy visitation, for both flea and mosquito do love the new-comer in a land to a degree not to be accounted for upon the supposition of habit reconciling to the infliction. But we need not look abroad to find the flea in numbers and activity not to be ignored, for in parts of our own country it has no respect coupled with its love of man. Some of the most wretched nights that we ever spent were passed in his company on the Pacific coast. Even within the precincts of delightful San Francisco we found the same kind of greeting in our coming, departure, and return, and we entertained our hosts. That San Francisco, the blessed, should have this affliction can only be accounted for upon the supposition that it is ordained that she shall be continuously chastened, lest the pride of her people should exceed all bounds. Thus is stationed with each of her denizens, as with the ancient king, and even accompanies him part way to the East, the monitor who constantly repeats with a nip, "thou art mortal, thou art mortal."

The flea is rarely taken prisoner in numbers. He is generally only to be subdued in single combat, and, like the Parthian, he fights while flying. His cavalry movements are much impeded by insect powder sprinkled in the bed at night, and in the parts of the clothing where he is fondest of bivouacking. One of the easiest ways in which he can be snared is also to many persons, ourselves included, most disagreeable to practice. However, as almost anything is better than the company of a flea, it is well to know any method of dispensing with it. Having a basin of water ready at hand, habitually walk about your bedroom in cotton-stockinged feet. The flea becomes entangled and helpless in the fuzz of the sole of the stocking. Caught between the thumb and forefinger, he should be plunged into the middle

of the water, to make sure that he shall not escape up the side of the basin. We have in a much afflicted flea country seen many fleas caught in this way.

When, during the day, one, being dressed, cannot with facility reach the flea, whose armor is proof against crush from the outside, the only way to do is to retire to one's chamber, and there, with the basin of water at hand, make a search in every garment, ready at a moment's notice to pounce with moistened thumb and forefinger upon the aggressor. He is sly and seeks dark corners and crevices, but a little experience soon makes one expert in capturing him. To become accomplished in this is not to be despised, for a single hungry flea may mar one's pleasure in the finest picture-gallery, distract the attention in an important conversation, or increase the labor of a task where one requires full possession of his mental faculties.

Alkaline, naphthol, or corrosive-sublimate solutions, used as lotions, speedily relieve the itching from flea-bites.

There are numerous other troublesome insects in the United States,—midgets, also called sand-flies; ants, bees, wasps, caterpillars, spiders, and even centipedes and scorpions. The two last mentioned are, however, very circumscribed in their range. The bites of insects we often cannot avoid, nor the inflammation produced by the contact with the hair of the caterpillar, but we can easily relieve the pain and itching involved by the use of ammonia-water, or solutions of permanganate of potassium, corrosive sublimate, or naphthol, or by borax lotions and ointments.

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CHAPTER XXVII.

THE COSMETIC CARE AND TREATMENT OF THE TEETH.

THAT the teeth are most useful and beautiful adjuncts of the body is self-evident. That they should be so beautiful, while subserving so utilitarian a purpose as theirs, is one of the insoluble mysteries. A young and pretty girl, inspired by affection for the love-lorn swain, beams upon him with her eyes, and he reciprocates the token with his, both adding a full view of the mills of their respective alimentary apparatus. This takes place without a thought, on the part of either, that the expression which reciprocally gladdens their hearts and irradiates their countenances has any other end and aspect than a manifestation of beauty. It is true that the whole outward appearance of the human body is seen, upon reflection, to represent usefulness underlying beauty, and, indeed, beauty conditioned upon usefulness, but no portion so flagrantly as this proclaims its subservience to the lowliest duties, while lending itself to one of the greatest charms of person.

We thank kind fortune that the modern novel is through with the chariot of Phœbus and other Olympian machinery, and simultaneously, for earth, has consigned the pearly teeth, with which heroines were always endowed, to the rubbish of oblivion. Pearly teeth have always been repellant to the eye of the connoisseur of female beauty, as indicative of fragile constitution. The two extremes of unsightliness in teeth, not decayed or crooked, are in those with the translucency of pearl or the cream-color of ivory. Between these two extremes lies beauty of color in teeth. As to their form, elongated teeth are not handsome, nor are those which are distinctively short. They both, particularly the first, indicate constitution which is not

robust. To be handsome, teeth must be fine in both form and color. With these two attributes combined in the highest degree, with immaculate purity, there is no attribute that can so much enhance the beauty of a handsome face, or better redeem the plainness of the ugliest.

The first, milk, temporary, or deciduous teeth, for they are known by all these names, are twenty in number, ten in each jaw. The permanent teeth, so-called (would that one could say so literally), are thirty-two in number, sixteen in each jaw.

Teeth are formed of enamel and dentine. There is a very thin layer of what is called cementum, around the fang, or root, of the tooth, but this is so inconsiderable that we may omit it from our present inquiry. The enamel is harder than the dentine, and lies on the crown of the tooth in nodules thinning to a layer ending in a mere film at the neck of the tooth, the place where it enters the gum. The dentine, the softer bone, called also the ivory of the tooth, surrounds the pulp-cavity, in which lies the pulp, the generatrix and preserver of the tooth in every part. Both of these kinds of bone, the enamel and the dentine, are harder than any other bones of the body, because they contain a greater percentage of bone-earth and less bone-cartilage than the bones of the body do. The varying proportions of bone-cartilage to bone-earth in all the bones of the body, including the teeth, recognize the varying needs of different structures. Hardness and toughness in these substances respectively,—the hardness in the bone-earth, the toughness in the bone-cartilage,—when combined in different proportions, fulfill all the varying requirements for the solid portions of the body.

The enamel contains only about $3\frac{1}{2}$ per cent. of bone-cartilage, the rest of it being bone-earth. The dentine, on the contrary, contains 28 per cent. of bone-cartilage and 72 per cent. of bone-earth. Compare these proportions with those of

ordinary bone. The ordinary bone of the human body, varying in composition in different parts of the body, with sex, age, health, and strength, contains, upon the average, about one-third of bone-cartilage and two-thirds of bone-earth. The bone of the teeth varies, too, with these conditions, especially with age. It is seen, however, that, speaking in general terms, the larger the proportion of bone-earth in bone, the harder the bone is, and that, on account of its largest proportion of that substance, enamel must stand first in hardness, followed by dentine. In fact, the enamel is the hardest of all organic tissues.

No matter what the kind of bone, it requires for its healthy formation nutritious and varying food. The same deficiency in these elements that, with foul air and generally unhygienic surroundings, leads to children having the cartilaginous limbs of rickets, leads also to their having stunted and defective teeth. Teeth never become otherwise than as they were nourished and grew. We have seen little children habitually set down to table to a meagre breakfast of cake and pie and preserves, with not an egg, and rarely a scrap of meat at any time; and this too where poverty did not compel, but where there was nothing standing in the way of their well-being but the densest ignorance on the part of their parents. Yet these children were expected to thrive on such pabulum. They had not the wherewithal to sustain a healthy vitality in any organ, and every detail of their bodies was impoverished and weazen. Of all miserable ways of saving, to starve the stomach is the worst. No better legacy can any father leave a child than a healthy stomach. With it the child, grown to manhood or womanhood, can front the world and dire adversity; but, without it, quails before the world as a creature of nerves to whom existence is inexorable. The ten thousand devils of dyspepsia wait on the days and nights of the richest who in early life have been denied what nature craves as the first conditions of continued vigorous life,—food plentiful and various.

The modern jaw is contracting. Such a change is strictly in accordance with present conditions of human evolution. Man was prognathous at one time; indeed is, in certain low races and individuals, even now. His canine teeth were once much larger than they are now. They were needed in his savage state as weapons, and with them he tore his ill-prepared meat-food. Civilization, through the art of cooking, renders food tempting, various, and digestible. It serves meat so that it does not require to be rent as by wild beasts. It is only ignorance that derides the art of cooking. What is vaunted often as plain cooking is nothing but confession of ignorance of the art. In proportion as it is an art, is it best fitted for the needs of civilization.

As we have seen, nature subordinates, suppresses, and in the long run discards that which is no longer of service. The fact of use and disuse, brought about by nature's compulsion to use or disuse, through natural selection, effects many changes. Dentists are right in their observation that the most modern, civilized human jaw, as compared with the jaw even within fifty years, has contracted, for the present range and phase of civilization are intensified beyond all previous experience on the globe.

Most persons think of the tooth as a solid bone. It is, on the contrary, a living structure. Not only do nerve-filaments and blood-vessels pass through the end of the roots, and thereby connect the pulp of the tooth with the general nervous system and circulation of the body, but from the pulp pass into the dentine an immense number of tubules containing filaments of soft bone-making substance, the dentine being thus injected and nourished throughout its whole mass.

The enamel is at its thickest points as much as a sixteenth of an inch through, and consists of little six-sided prisms placed side by side, and held together by some exquisitely fine cement-

ing substance. These standing upright, invested with a lamina of very fine bone-cuticle, naturally form a barrier to the invasion of decay, but if, through weakness of constitution or carelessness, the surface be attacked, the structure is, as its formation clearly shows, liable to rapid disintegration. Decay, having penetrated the enamel and reached the dentine, makes havoc in that relatively soft bone, the pulp of the tooth becomes diseased, and toothache may be the first sign observed of the fact that disease has reached the citadel of the tooth's life.

In the preservation of the teeth two dangers are especially to be guarded against,—the lodgment of particles of food between the teeth, and the accumulation of tartar on them. The first of these dangers can easily be avoided by passing, nightly, and after meals, if there be time, between the teeth of both jaws a thick piece of silk thread, or even of home-spun thread, if no better kind be procurable.

The presence of tartar causes a recession of the gums. This occurs partly from the fact of the irritant composition of tartar, and partly from that of its being a foreign body impinging on the delicate edge of the gum inclosing the tooth. With some persons the chemical composition of the saliva is such that the deposition of tartar is always great, and assiduous care of the teeth is required to keep them free from it. Tartar consists chiefly of earthy phosphates. It is a complex secretion derived from three glands, and is chiefly alkaline in its chemical reaction. Klebs, a very high authority on this subject, has found with the microscope that it is full of micro-organisms, and he believes that these organisms assimilate matter in the saliva, and cast it down in the form of calcium-salts. If he be correct in this view, the fact readily accounts for the rapidity with which tartar sometimes invades the root of the tooth under the gum. When once it has begun decidedly to invade the root, the periosteum, the lining membrane of the alveole or socket of the tooth, becomes

inflamed, constituting the disease of dental periostitis. It is then a question of only a very short time when the tooth shall, from the degeneration and absorption of the tissue of the socket, begin to loosen and project beyond the line of the other teeth, and either fall out or require removal.

It is customary, when the recession of the gums from this or another cause begins to take place, to apply tincture of myrrh to the parts to stimulate the circulation and remove their tendency to flabbiness. The astringent and other qualities of myrrh are doubtless very beneficial for the purpose, but it may well be questioned if, when the disease has proceeded so far as to involve the periosteum, anything can be done to check it. The best that can be hoped for is to palliate and retard the encroachment of the disease. With this end in view, we give, at the end of this chapter, three formulæ which will be found useful for such treatment.

The part of wisdom is to look by our practice to the prevention of the disease, rather than to endeavoring to stay its ravages after it has once attacked. What we would suggest as a universal practice, in view of the fact that we are not addressing our advice solely to the pampered children of fortune, or to those who, without being such, possess ample means and leisure, but to the millions who are hurried through life, who must neglect the brushing of the teeth on many occasions, or who, brushing them, do so inadequately : what we would suggest, we would say, in view of all these conditions, is the adoption of a simple practice long followed by the Irish. Clean the teeth and gums occasionally with common salt, rubbed without violence into the gums above and below with a piece of soft muslin. Under the regimen of an occasional cleaning of the teeth and gums with this substance, all deposits injurious to them, whether micro-organic or otherwise, are utterly destroyed.

Do not forget, in cleaning the teeth, no matter with what

you may clean them, whether as an instrument or a cleansing substance, that they should be cleaned inside as well as outside. The deposit of tartar is frequently very much greater inside than outside of the teeth, and, even in case there is no abnormal deposit of tartar, the teeth are not properly cared for to insure their lasting if their inside surfaces are neglected. In using a brush, do not forget that the circulation of the gums should be gently stimulated by it. For this reason it is best always to use a moderately stiff brush, not one that is uncompromisingly hard.

We have in America the best dentists of the world. When a child is getting its second teeth, and they are not coming in with perfect regularity, take the child at once to a first-rate dentist for advice and treatment. Thus you may insure it comfort throughout life, and perhaps guarantee it against a deformity easily preventable.

Many are the varieties of dentifrice,—powders, pastes, and lotions. Some of these are extremely injurious to the substance of the tooth. The "street-fakir" who removes the tartar instantaneously from the small boy's teeth, and leaves in its place a white, glistening surface for the admiration of the gaping crowd, has really removed, with some corrosive substance, a goodly portion of the enamel of the tooth, which can never be restored. Dentifrice is very commonly made of some powdered bark, mixed with pulverized charcoal and some acidulous salt, such as cream of tartar. Orris-root is perhaps one of the ingredients that are most largely used. Pulverized charcoal, although very antiseptic and purifying, is rather too harsh a substance, even in that finely-divided state, to be used habitually on the teeth. Tooth-powders and tooth-pastes seek to combine the polishing effect of finely-divided substances with antiseptic qualities. Tooth-washes are simply for antiseptic purposes and for rendering the mouth and breath fragrant. In case one has a good dentist, the very best way is to refer all matters concerning the

treatment of one's teeth, including cleansing substances for them, to his judgment, as the one best situated to know the requirements of one's individual case.

The following is a good prescription for tooth-powder :—

Precipitated chalk,	1 ounce.
Ground orris-root,	1 ounce.
Oil of roses,	1 drop.

Brush the teeth with a moderately stiff tooth-brush dipped in this, which is a simple but effective and harmless tooth-powder.

The following is an excellent tooth-wash :—

Salicylate of sodium,	2 drachms.
Tincture of myrrh,	2 ounces.
Gaultheria (wintergreen),	5 drops.
Distilled witch-hazel,	4 ounces.

To be applied every day to the teeth with a stiff brush.

The three following prescriptions are for shrinkage of the gums :—

1. Chloride of zinc, 20 grains.
- Water, 1 drachm.

Apply to the gums every other day with a piece of raw cotton, being careful not to get any of the mixture down the throat, and rinse out the mouth at once with water.

2. Tannic acid, 40 grains.
- Tincture of myrrh, 1 ounce.
- Rose-water, 1 ounce.

Use twice daily by moistening with it a piece of raw cotton, or applying it with the end of the finger over the gums inside and outside.

3. Iodine, 10 drops.
- Iodide of potassium, 8 grains.
- Glycerin, 1 ounce.

Pencil over the gums once a day.

CHAPTER XXVIII.

THE CONSTRUCTION AND CARE OF THE EYE.

THE eye is, metaphorically as well as otherwise, the most abused organ in the world. In the old nautical novel, which presumably portrays life as it was at sea a hundred years or so ago, the old salt always affectionately shivered his mess-mate's timbers and damned his eyes; nor, as to the eyes, has the practice altogether ceased to the present day on both land and sea. So far as we are aware, no language but English is so reckless in the matter, and, as for the actual precautionary care bestowed upon the eye, different peoples, nations, and individuals are pretty much alike in incautiously squandering the treasure of its sight.

The time could not be more opportune than now to say a warning word about the usage to which the eye is subjected at present in this country. We live in the land of the practical plumber, as if a man could be a plumber at all unless he were practical. We live in the land of the undertaker, willing to undertake anything, whether or not it be within the sphere of his knowledge on the subject. The land swarms with opticians practicing as oculists, and of journeymen-workmen and street-fakirs practicing as both. The public is being exploited in the interest of the sale of eye-glasses, while reputable and skillful oculists, than whom there are none better in the world than here, lose the practice whose possession it would be much more to the advantage of the public to have, than theirs to secure. Sensational advertisements flaunt in the public prints with diagrams for self-testing of the eye, to which attention is directed by some such legend as, "Are you astigmatic? If so, go to Tom, Dick, or Harry [as the case may be], and be fitted with glasses."

First of all, the public does not know that there are regular astigmatism and irregular astigmatism; and when we say that there is regular astigmatism, we say in effect that the best natural eye is astigmatic. The best natural eye is, we repeat, regularly astigmatic; the condition is consequent upon an organic defect of the eye, and, therefore, to tell the public generally that persons had better beware lest they be astigmatic gives them pretty much the same kind of mental disturbance as that experienced by the very little boy when told by a slightly bigger companion that he has a bone in his leg.

The major axis of the eye subtends a flatter arc (the horizontal curve of the eye) than the arc subtended by the minor axis (the vertical curve of the eye). Hence, when we focus a vertical line with the sight, a similar line horizontally placed with reference to it is somewhat out of focus, and *vice versa*. Hence, also, when we look at parallel vertical lines, they seem farther apart than do the same lines when placed horizontally. It follows from this fact that the same lines, turned slowly around in front of us, will present all apparent gradations of distance apart, between their apparent distance apart when held vertically and their apparent distance apart when held horizontally.

If the law should protect the public, as it is now beginning to do, from the tampering with certain medical matters of men not medically educated, it would also seem that the quackery of treating the eye by any one but trained oculists should be legally prevented. A whole population of midgets has lately sprung up, looking like little goggle-eyed sea-monsters, who, from the very fact of their enormous numbers, prove the impossibility of their having all been under the care of trained oculists, and that the advertising nets have not been cast in vain into the vasty deep of human credulity.

Enough for the present on this branch of our topic has been

said. For the reasons assigned, our advice to you is (if you think that you have anything the matter with your eyes, or even suspect that you may possibly, without actually knowing it, have something, either organic or functional, the matter with your eyes, or you wish to establish the fact, once for all, that at least constitutionally your eyes are normal) to go to an oculist, a real oculist, not a quack nor a mere optician. The cost will be as nothing compared with that which may be entailed by going to any one but an expert for advice as to so delicate an organ as the eye.

Here, incidentally, we avail ourselves of the opportunity to say also a cautionary word as to an injurious practice which is limited to the members of one sex, which is not prevalent among them, and which is yet sufficiently followed to warrant a passing notice here. An oculist properly applies belladonna to the eye with his special object of dilating the pupil, but it does not follow that the same thing can be indulged in at pleasure without damaging the organ. Yet we are sometimes asked by young women if the application will do the eye any harm, the inference being obvious. We therefore say here, as we have had occasion several times to say orally, that such a practice is injurious. It stands to reason, even to common sense, because the dilatation is artificial. Nature does not kindly tolerate tampering with the mechanism of the body. Girls also sometimes ask us if arsenic tablets will do them harm, the inference again being obvious. Arsenic is a very useful drug in certain diseases, but not useful in health. The giving of drugs in diseases is a choice between evils, but in health there is nothing but good, the greatest of all earthly possessions. Foolish is the girl who seeks to make her eyes full-orbed with belladonna, or sparkle from sips of cologne, or give plumpness to her figure with arsenic. The only reproach that has ever been justly made against American beauty, that it does not last, she hastens to justify by making a laboratory of

herself. All these are meretricious aids that lead, no one who begins to use them can tell whither, but to certain loss in some form. This work has been written in vain if it has not shown that the only perennial source of youthfulness and beauty is the fountain of Hygeia, the goddess of health.

The eye is beautiful, when beautiful, in all colors. This may be acknowledged by every one, although every one has individual preference for a certain color of eye. Close observation will prove these statements true. The French have discovered that the generally much-despised green eye is, when fine, probably the handsomest eye in existence, because, as compared with any other equally fine, capable of a larger range of lustrous tints and consequent range of expression. One difference among eyes that is related to great difference in beauty among them seems to have almost escaped attention. This is the color of the cornea, the so-called white of the eye. In the negro, white as is the general effect of the cornea as compared with the darkness of the skin of the face, near observation of it shows that it is of a yellowish cast. This is always an unsightly tint for the cornea. It is seen in the white race in the case of bilious persons, and markedly in cases of jaundice. But neither is the cornea handsome when it is very white. Then it has a glairy effect, like that of the white of an egg. The handsome cornea is tinged with the most delicate violet color. The eye depends, in sum, for its beauty, independent of its particular color, upon the just degree of globular effect, the curves of the veiling lids and lashes, the violet-tinged clearness of the cornea, and the size of the iris, popularly known as the pupil, with reference to the whole orb.

A very popular error about the eye is that it varies exceedingly in size among different races, and, indeed, among individuals of the same race. The fact is that the globe of the eye varies very little as to size among different races and individuals.

What leads to this mistake is the correct perception of the very different degree in different persons in which the ball of the eye appears as set in the socket; the extreme of insertion making it look as if, were it left to itself, it might fall inside of the socket, and the extreme protrusion of it, as if, under similar circumstances, it might fall outside. In the Mongolian race the eyes seem to be set slanting in the head, but that is an effect which is produced by a droop of the inner part of the upper eyelid, a characteristic of the race, and which, when occurring as an abnormality, is known among us by the medical term of *epicanthis*.

The following will afford a sufficiently accurate notion of the structure of the eye, omitting details that would only serve to embarrass the conception of the general reader.

Very nearly four-fifths of the globe of the eye at the rear is composed of a tough, whitish, opaque membrane, called the sclerotic membrane. This is continuous with a translucent membrane, which occupies almost one-fifth of the front of the eye, called the cornea. To say that the first membrane, the sclerotic, is sometimes called the opaque cornea shows the general relations between the two substances. So we have, to begin with in our conception, a globe formed, at the rear and sides, of an opaque membrane, with a small, circular, convex membrane let into its front as a window-pane, and for the same purpose as a window-pane is used—the admission of light. The physical apparatus constituted by this globe and its attachments is similar in principle and analogous in processes to the camera-obscura, with which photographs are taken.

In, and just back of, the centre of the pane of the corneal or transparent, horny substance is the iris, the richly-colored circle that constitutes the chief beauty of the eye, which circle, by means of its dilating and constricting muscles, automatically increases and diminishes in diameter the opening in its centre,

called the pupil, in accordance with the desirability of the admission of more or less light to the interior of the eye. The iris is suspended in an aqueous or watery humor, and in the rear of the opening of the pupil through it there is a small lens of crystalline humor, by means of which the rays of light received by the eye are refracted through a vitreous or glassy humor upon a dark screen at the back of the eye.

This dark screen at the back of the eye, called the retina, corresponds with the sensitive plate placed for the reception of the picture in the photographic camera-obscura. Carrying out the analogy a step farther, we might add that the light from objects in the outer world, entering the eye and passing through its lens, forms a negative picture on the retina, which picture is "developed" by the brain, and, as a last process, presented to the mind. By what intermediation the final wonderful leap is made, of translation of mere physical conditions into psychical terms, is now and must forever remain an insoluble mystery.

To recapitulate,—the eye receives, through the cornea, light from the outer world into its inner chambers. The rays received, sensibly parallel, are refracted through the lens so as to appear on the retina in their due relations to each other,—reversed, but correctly interpreted by the brain. The intensity of the rays is regulated by the increase or decrease of the opening formed by the pupil. The lens, back of the pupil, combines these rays in a picture corresponding to that in the outer world, the picture falling on the screen of the retina. The optic nerve, through which the brain receives the final impression, is closely associated with the retina.

This is, in brief, the mechanism for seeing. It would not perhaps interest the reader to go more minutely into examination of this wonderful structure, through whose instrumentality man is brought into close relations with the universe, and the attempt, as we said at the beginning, might lead to obscuring

the general clear conception instead of expanding it. Suffice it to say, in conclusion, that here but a fraction of the wonderful truth has been told, and if any reader, attracted by what has been mentioned here, should wish to learn more on the subject, he will find its literature extensive and most interesting.

The eye is, nevertheless, not a perfect organ. It is liable, even at its best manifestation, to be deceived in color-effects following each other, or coincident in time, and many persons possess the organ so chromatically imperfect as to be largely color-blind. The physical causes which lie at the foundation of the perception of color are too obscure, and the subject, consequently, too abstruse to be discussed here. According to our own notion, what is called the Young-Helmholtz theory as to the causes of the perception of color in all its gradations is the most closely accordant of any theories on the subject with the facts in our possession. According to this theory there are, in fact, only three fundamental colors concerned in the production of the tints that we perceive, and the variety of these depends upon an arrangement of the color-mechanism of the eye, by which the three fundamental colors are so combined in varying degrees as to present the infinitude of tints that we recognize. This theory can be properly elucidated only by means of a diagrammatic representation and an elaborate discussion, which would be out of place here.

Returning to practical matters for the million, we conclude with a few remarks as to them.

No general amelioration of the tendency to all sorts of abuse of the eye can be effected but by general appreciation of the fact that all organs of the body are instruments, similar to other instruments in their liability to injury, and the certainty to which they are doomed, even with the best care, to wear out in the course of time. This fact should be well pondered as especially cogent with reference to the exceedingly delicate

instrument of the eye, if we would have it last its allotted normal duration of usefulness, which varies greatly in different individuals. The greatest habitual carelessness is observable among people generally as to avoiding straining the sight. For one person in a thousand who habitually places himself or herself in the best position to read or to write, the remainder seem utterly indifferent or ignorant on the subject; yet every individual eye has, like any other individual organ or mechanical instrument, just so much capacity, and no more, for exercise of its mechanism without damage to it. There is no more desirable practice with reference to the use of the eye than never to fail, in reading, or writing, or sewing, to put one's self in the very best attitude for the comfort of the organ while being exercised, and this is, seated with the source of light back of the eye and falling on the book or writing-paper, the best light for writing passing over the left shoulder, so as to avoid having a shadow from the writing-hand. Trifling as this practice seems as equal to insure an end, it is not trifling in its saving effect as the practice of a life-time. The amount of light is another consideration. We should not attempt to read or write with a light so weak as to require from the eyes a perceptible effort to distinguish the characters before us. The duration of continuous employment of the eyes is another important consideration. One should carefully gauge his own individual capacity for duration of the exercise, and stop before there is the slightest feeling of tire. A very good practice in reading is occasionally to let the eyes roam from the book around the walls of the room, and return to it by a long circuit. This operation has the effect of varying the focus of the eye, and affording great relief in the tension of its continuous employment. The same plan as that described for indoors applies to outdoors,—the eye should look from the relatively dark place to the relatively light one. Therefore, in the intense glare of the sun the eyes should

be well shielded by the head-dress, whatever it may be. We suppose that never was one discovered yet by women that is so delightfully protective as the old-fashioned country sun-bonnet, from whose cool depths they safely peered forth into the most blazing light.

Eyes are notably subject to two organic defects, called myopia and hypermetropia. In the first, which is very common, and generally known as short-sightedness, the picture from the lens of the eye falls short of the retina. In the second, which is long-sightedness, the picture tends, by the remote convergence of the rays forming it, to lie back of the retina. In neither case is there at certain distances, if visible at all, a proper picture seen. Concave glasses are the mechanical appliances that rectify short-sightedness, and convex glasses those which rectify long-sightedness. The flattening of the eye with the increase of age lessens short-sightedness, but it is obvious that this same change would with years but increase the opposite condition.

Presbyopia, or old-sightedness, is a condition that, as its name indicates, comes with age. The eyes are long-sighted, but not longer-sighted than they were in youth. It is for near objects that they assume with age the condition described for hypermetropia, where the image tends to be formed back of the retina. Consequently, for this condition as for that, convex glasses are worn, because they have the effect, in conjunction with the lens of the eye, of focusing the rays received from objects in the outer world nearer to the front of the eye, and, if glasses are properly selected, exactly on the retina. This condition of the eye is due to loss, through muscular deterioration, of former power of accommodation of the sight to objects at different distances, and also to the flattening of the lens of the eye from age.

The eye in its finest condition has this capacity, of what is

known to oculists as "the accommodation," the ability to focus the object on the retina over a great range of distance from far to near. Indians, who roam the open country, and who are habituated to long, visible distances, and who also work at objects requiring the nicest scrutiny, such as baskets, arrows, bead-work, etc., have the accommodation of the eye enormously developed. So, for a similar reason, have those surveyors who practice geodesy (surveying in the open), for, with them, the eye is used to sight alternately far and near, down to reading the delicate graduation of mathematical instruments.

The wearing of glasses, whether in youth or age, should not be postponed a day beyond the time when they are needed. Young people should be taken at once to an oculist upon the slightest suspicion that anything is amiss with the eyes. Persons who are sure, from long experience, of having no defect of the eye, should, as they approach middle-age, go at once to an oculist to be fitted with glasses, at the slightest intimation of a failure of sight. The infallible intimation of waning power in the sight is the perception of a difference in the ease with which one reads by gas- or lamp- light, as compared with the light of day. Abstention from going is equivalent to saying that rest will not be given to the aging and enfeebled eye. The person who would take a cane to support his tottering steps declines to afford relief to the weakness of the most delicate organ of the body. Do not imagine by ignoring glasses to deceive the world into thinking that you do not need them. Many signs will betray the fact, even if you have not the *arcus senilis*, or white rim of age around the iris. The world sees through this sort of pretense without the aid of spectacles.

Having adopted glasses at a suitable time, do not fail to increase them in strength as the sight becomes more and more presbyopic. Not long ago we used to meet a nice old man in the cars, with whom we had an occasional chat, whose glasses, month

by month, were placed nearer and nearer to the tip of his nose, until one morning, when we found him with them on the very tip, barely able to maintain their place, the impulse to which we yielded was irresistible when we said to him, "You will either have to get new glasses or a longer nose." Fortunately, his sense of humor enabled him to take a kindly joke, and so his eyesight and appearance have been simultaneously benefited from a casual remark that brought about instant realization of a habit insensibly acquired and prejudicial to both.

Eye-washes are applications for use, as the case may be, on the eyes or on the eyelids, or on both. For congestion and irritation of both eyes and eyelids, the simplest wash is hot water applied frequently to the parts. Applying it, night and morning, it will often give the greatest relief and arrest many diseases of the eyes and eyelids :—

TEA EYE-WASH.

Hot water poured on tea-leaves, and the mixture allowed to steep and cool, makes a soothing eye-wash.

WITCH-HAZEL EYE-WASH.

Distilled witch-hazel, 1 ounce.
Pure water, 1 "

To be used especially for eyes irritable from cold. Bathe the eyes frequently with the wash.

BRANDY EYE-WASH.

Brandy, 1 drachm.
Water, 1 ounce.

To be used especially for eyes irritable from cold. Apply frequently.

ALUM EYE-WASH.

Alum, 1 grain.
Pure water, 1 ounce.

Drop gently, night and morning, into the eye with the tip of a feather, a pipette, or some such thing, and this will sensibly relieve inflammation.

ZINC EYE-WASH.

Sulphate of zinc, 1 grain.
Rose-water, 1 ounce.

Drop the solution gently into the eyes, night and morning. For inflamed eyes.

BORAX EYE-WASH.

Borax, 1 grain.

Camphor-water, 1 ounce.

Pour the solution in the eyes several times a day. For inflamed eyes.

The following is a salve for inflamed eyelids :—

Oleate of mercury salve, 1 drachm.

Rub into the eyelids after bathing them gently, night and morning, with hot water.

The following is a useful recipe for a salve for inflamed or granulated eyelids :—

Yellow oxide of mercury, 1 grain.

Rose-salve or unsalted butter, $\frac{1}{4}$ ounce.

Apply to the eyelids night and morning.

The following recipe for what is called alum-curd is for granulated eyelids :—

Take a piece of alum about the size of a walnut, and rub it into the white of an egg until a curd is formed. Place the curd in a couple of thicknesses of fine gauze or bobbinet, and apply it thus to the eye. If bobbinet is used, first wash the stiffening out of it.

These recipes are given for the benefit of those who may need to know on the spur of the moment some efficacious treatment for an inflammation of the eye or eyelids, and upon the presumption that the ailment is not serious, or, if it be, that no good medical man is within reach. Whenever, on the contrary, there is opportunity, and, in the case of judging that the ailment is slight, there be any doubt remaining in the mind as to the fact, recourse should be had at the earliest possible time to the advice of a regular medical practitioner. A person might think that he has merely a blood-shot eye, when in reality he has an affection called pterygium, requiring astringent treatment, and perhaps other treatment that no one but an oculist can properly prescribe,—perhaps even an operation on the eye.

CHAPTER XXIX.

THE CONSTRUCTION AND CARE OF THE EAR.

THE human ear is not to be regarded as of the best possible form, nor as always in the best position for the collection of sounds. One will observe in the lower animals, in many of which the hearing is far more acute than in man, that the ear is larger, of simpler form, and mobile. Among some of these the concavity of the ear can be directed toward the place whence the sound seems to proceed. Doubtless the human ear was originally of a very different shape from its present one, and the convolutions which it now possesses represent a general collapse of the organ, the absence of its motile power having coincidentally come about in the course of ages, as being no longer needful in man's present higher stage of existence. Darwin even thought that the point on the inner side of the selvedge-edge of the ear, about a third of the way from the top, which is a very marked feature of the organ in some few individuals, is to be recognized as the rudiment of a former peak of the ear. He also enlarges upon the fact, known to some persons, that in certain individuals the ear can be moved at will. Darwin's idea of the rudiment of which we speak being the representative of a former tip of the ear, now folded in, brings with it a vivid reminiscence of Hawthorne's Donatello, in the "Marble Faun,"—that strange creature who touched so nearly on primeval nature.

If any one should think it superfluous to mention that the ear is not, as compared with that of some of the lower animals, well adapted to collecting sounds, it will be sufficient to say to such a one, that the fact is not always apparent. Even so learned a man as Reis, a German professor, who, in 1860, undoubtedly invented the telephone, evidently had so much

confidence in the shape of the human ear as the fittest vehicle for at least the sound of speech, that he constructed his first telephone with a receiver (called in telephony "the transmitter") shaped like the human ear. The ear receives any sounds fairly well, although how much better it would receive them if it presented a larger concave surface, capable of moving, is proved by the common practice of one hard of hearing, in adjusting the curved hand back of the ear with reference both to the intensity and direction of the sound sought to be heard.

The human ear in the present human life is not, be it understood, ill-adapted to the requirement of it. It is the requirement of it which has largely contributed to stamp it as what it is. We are but comparing it with ears of finer organization for hearing. Its existing convolutions are serviceable in directing sounds through the passage upon the drum of the ear, as has been tested by filling up the convolutions with some plastic material, like wax, whereupon the diminution in hearing became appreciable. But surely, as we have proved by citing a single experiment, which any one can try for himself, we should hear better if the ear were larger and differently shaped and capable of movement. This fact, however, does not involve the conclusion that we should be equal even then in acuteness of hearing to some of the lower animals, the interior apparatus of whose ears is evidently more highly organized than ours. As mankind have advanced in intellectual power, and have developed the inventive faculty, they have become less and less dependent upon the strength and the acuteness of their merely physical attributes. They must have been untold centuries without an acute sense of hearing, even as it is found where most highly developed in human beings, among savages. Yet it is only very recently that, in the German army, dogs have been trained in connection with outpost duty, a service in which their special keenness of hearing admirably supplements the intelligence

of videttes. It is truly remarkable that this use of the dog had never previously been made a part of regular military administration.

The outer ear collects waves of sound and transmits them through a short channel terminated by a tense membrane having the same function as that of the parchment head of a drum. This membrane is, for that reason, called the drum-membrane of the ear. The drum of the ear is constituted by that membrane and the chamber which it closes. Delicately attached to the back of this membrane is the end of a small bone, called the hammer. The hammer, at its other end, is jointed with another bone, called the anvil. The anvil, in turn, is jointed with a third small bone, called the stirrup. These three articulated bones together form what is known as a compound lever.

When a sound from the outer world strikes upon the drum-membrane of the ear, it makes that membrane vibrate with the intensity and quality of the impulse which characterize the sound. This vibration is taken up by the end of the lever forming the hammer, conveyed thence to the anvil, and thence to the stirrup.

At the stirrup a new series of physical characters present themselves, completed by the phenomenon of hearing. The bottom of the stirrup is in contact with an oval opening into the solid temporal bone, which opening, likened to a window, is covered by a membrane. Beyond this oval, membrane-covered window, and carved out, as it were, in the dense bone, is what is called the labyrinth,—a chamber consisting of beautifully curved passages, in which is a membranous sac containing and surrounded by fluid. The finer details of the structure of the labyrinth are too numerous and complicated to be here described, relating, as they do, to the minutest anatomical research assisted by the microscope. Suffice it to say that, immeshed in this membranous sac, filling the bony passages of the labyrinth, spread

out the hair-like terminal filaments of the auditory nerve, by means of which the perception of sound becomes one of the functions of the brain.

Here, at the labyrinth, the new departure, after the vibration from the drum-membrane has reached the oval, membrane-covered window of the labyrinth, begins and ends with the sensation of hearing. The bottom of the stirrup conveys the vibration to the oval, membrane-covered window; that membrane transmits the impulse, in quantity and quality, to the fluid inside of the membranous sac in the labyrinth; it, in turn, transmits the impulse to the long, hair-like processes that lie spread out within the sac; and, lastly, they transmit it to the auditory nerve, whence, as a finality, it reaches the brain. Here, however, as in the case of the eye and the faculty of seeing, we reach a point incapable of solution by the human intellect. How is it that a vibration—a transient physical fact, communicated to the auditory nerve—ceases to have merely physical attributes, and is translated from a sensation into an emotion? It is impossible that any one should ever be able to find out the reason for this. If any one think so, he is ignorant, or presumptuous beyond the bounds of expression to characterize his folly.

It must seem to the general reader as if all that is necessary to a description of the ear had been said, and yet, were there not something else added, the structure would have been described as very imperfect. It is requisite to the excellence of the apparatus of the ear that there should be a constant supply of air in the drum-chamber. The special apparatus which supplies this need is called the Eustachian tube,—a tube from $1\frac{1}{2}$ to 2 inches long, situated at the side and rear of the upper part of the throat, opening from the portion of the throat that is called the pharynx. During swallowing this passage closes. Air is, however, at the normal tension, supplied through this passage to the drum-chamber, thus equalizing the atmospheric

pressure on the opposite sides of the drum-membrane. If it were not for this, the atmospheric pressure on the outside would force the drum-membrane constantly inward; a certain muscle connected with it would not be able to act efficiently upon it, and, besides, sound could not be conveyed so readily, as now across the drum-chamber.

When the opening of the Eustachian tube into the pharynx is partially closed by inflammation of the throat, as from cold, or from some other cause, the hearing is much impaired. We can, upon reflection, realize that this must occur when we know that, although the chief agent in conveying the vibration of sound across from the drum-membrane to the oval, membranous window of the labyrinth is the compound lever formed of the hammer, anvil, and stirrup, yet that air in the drum-chamber must also be a medium for the conveyance of the vibration. For this reason persons hard of hearing hear so much better when they use one of the modern flexible fans constructed for deafness, which is bowed at pleasure with a string, and the upper edge of it placed between the teeth. We hear by the affection mediately of different surrounding parts of the auditory apparatus. Primarily, we hear by means of the action of the base of the stirrup on the oval window, and by means of vibration of the air in the drum-chamber acting on the oval window; but if any one has ever been in bathing, as we have, during a severe thunder-storm, he knows from the intensity of the sound, if he has happened to plunge his head under water during a violent peal of thunder, that vibrations are communicated directly to the ear from every portion of the bony structure of the cranium, as well as through the passage of the outer ear, and, perhaps, despite the closed lips and teeth, through the Eustachian tube. At any rate, the din is frightful, and of singular complexity of sound effect.

In cerebral disease, impressions of hearing may be due to physical causes not proceeding from the outer world. The

effects are real, not imaginary ; but interior, not exterior ; arising from the disturbance of disease. They are sometimes, in the case of the insane, not only, as indicated, caused by disease, but come in turn to be a cause of its aggravation, from the fact of their being considered by the sufferers as objective sounds, or sounds originating in the outer world, and, besides that, are misconstrued as to significance, and regarded as persecuting voices. If the reader should ever come across a French work by A. Briere de Boismont, on hallucinations, he will find the topic of subjective noises, believed to be objective ones, elaborately set forth. When it is known that the acutely insane are liable to tumors of the ear, it ceases to be surprising that they should be prone to misinterpretation of sounds. But, putting tumors entirely out of question, when we reflect that insanity is a disease of the matter of the brain, and that the brain is connected with the ear by means of the auditory nerve, it is easy to see that the cerebral disease may involve that nerve, and all reason for wonderment at the delusions of some of the insane from a perverted sense of hearing, physically coupled as the optic nerve is with the organization of the brain proper, should cease.

There are various disorders to which the ear is liable. The most common of these is simple earache, which is caused by inflammation of a part or the whole of the meatus auditorius, or passage into the ear from the side of the head. The reader will remember that there is another passage into the ear of which we spoke—the Eustachian tube. For the affection of earache nothing is more effective than the applications made with the lotions represented by the two following recipes :—

Tincture of opium (laudanum),	2 drachms.
Olive-oil,	2 “

Heat the mixture, and insert in the ear a small piece of raw cotton moistened with it.

Sulphate of atropine,	4 grains.
Pure water,	½ ounce.

With a camel's hair pencil brush inside of ear frequently with mixture.

In a similar manner a 5- to a 10-per-cent. solution of cocaine can be administered to the ear, affording quick relief from pain. Syringing it with simple hot water is also sometimes attended with speedy relief from pain.

Affections more serious than earache should cause instant resort to a skillful aurist, as any one can for himself judge advisable, when it is mentioned that there may be ulceration and abscess of the ear, thickening and perforation of its drum-membrane, producing partial or entire deafness, and many more ailments of the organ, some of which are very obscure, and undiscoverable except by the skillful aurist. The Eustachian tube may be partially occluded (closed) from the presence of inflammation in the throat, and, as previously mentioned, this condition affects the hearing.

The ear, we wish strongly to impress upon the reader, is liable to affections that need the interposition of the aurist. This is sometimes the case even when the difficulty is not so serious as to suggest impairment of the organ, as in the case of the formation of a hard mass of wax at the bottom of the outer passage of the ear. The wax of the ear is secreted for the benefit of the organ, but, especially in old age, it sometimes forms in a hard mass which the sufferer might find it difficult, or dangerous to the drum-membrane, to attempt to dislodge. It is best, therefore, in all cases beyond a simple earache, to go without delay to an experienced practitioner in diseases of the ear. Take time also by the forelock by obtaining proper medical advice in the case of children who, from being of a scrofulous constitutional taint, have running from the ears. This is sometimes produced by enlargement of the tonsils affecting the Eustachian tube, and should be attended to.

Delicate membranes such as those possessed by the ear cannot long withstand the invasion of pus, or matter, as it is popularly called, that flows from ulcerations and abscesses.

Nothing but the eye approaches the ear in delicacy of organization, and it will not bear tampering with or neglect. Therefore, our first and last advice is to go to an aurist when you suspect that you have any serious affection of the ear. With the sentinel of pain as your guardian, with the sense of hearing as your guide, you ought to be able to divest yourself of illusions. One last word only as to an aurist. Be sure you find a good one, for a quack would be worse than none.

The practice of wearing pieces of cotton-wool in the ear is not considered good. They sometimes prevent the egress of septic (poisonous) fluids that should be allowed free escape. In a case of unusual sensitiveness of the ear to cold, one might properly adopt the plan for an occasion of unusual exposure. We are, however, speaking to the point of the constant habit of thus protecting the ear. If it seems to require such protection habitually, that is proof that it is not in a healthy condition, and recourse should be had to the advice of an aurist as to the proper treatment to adopt to render it less sensitive to cold.

If your case is one of only moderate stopping up of the ear with wax, not such a one as we have witnessed, where the hearing was sensibly disturbed and the uncomfortableness great, from the presence of a mass of hardened wax, or if you are away in some place remote from civilization, where it is not possible to have access to a good aurist, you would be warranted in carefully syringing the ear with soap-suds and hot water, which simple treatment sometimes has the effect of softening and removing the wax. Under these circumstances, obeying the law of necessity, one is of course warranted in treating himself for any affection. We therefore add to the previous directions others which may be found useful under similar circumstances. You may, after syringing the ear with soap-suds and hot water every day or two, twice daily have some glycerin dropped into the ear, or you may dip a piece of raw cotton into the glycerin

and insert it in the ear. The following recipe is useful for the same purpose :—

Borax, 20 grains.
Olive-oil, 1 ounce.

Heat the mixture, and drop some of it into the ear once or twice a day.

The two following recipes are merely for external treatment, to remove inflammation of the auricle, as it is called,—the external ear,—and to heal cracks in it :—

1. Carbonate of lead, $\frac{1}{2}$ drachm.
Oil of eucalyptus, 8 drops.
Ointment of benzoated oxide of zinc, $\frac{1}{4}$ ounce.

Rub well into the part night and morning.

2. Oil of cade (tar), $\frac{1}{2}$ drachm.
Carbonate of zinc, $\frac{1}{4}$ "
Lard washed free of salt, $\frac{1}{2}$ ounce.

Apply to the surface of the ear.

As the odor of tar is offensive to some persons, the following recipe is added for their especial benefit :—

Beta-naphthol, 5 grains.
Oil of chamomile, 5 drops.
Acetate of lead, 10 grains.
Oxide of benzoated oxide of zinc, $\frac{1}{2}$ ounce.

Apply to the surface of the ear twice a day.

CHAPTER XXX.

THE NOSE, IN ITS PHYSICAL, MORAL, AND INTELLECTUAL ASPECTS.

IF any one suppose that the nose has no legitimate place here, it may be sufficient to remind him that one peculiarity of the nose is its disposition to poke itself in where it has no business. But we maintain stoutly that it has a right to notice here, not only on account of its physical significance as an attribute of beauty or of ugliness, but on account also of its mental and moral significance.

A perfect nose is exceedingly rare. Apropos of this demonstrable fact, we proceed to illustrate it by an anecdote of an occurrence affording much amusement at the time to those who knew personally or by hearsay of the dry humor and quaint ways of putting things occasionally indulged in by the late Dr. Franklin Bache, formerly professor of chemistry in Jefferson College, and one of the two original writers of the "United States Dispensatory." Meeting one day an artist of his acquaintance, in whom he took an interest, he feelingly discoursed to him on his own experience as to how exceedingly rare is a handsome nose, concluding by informing him that he happened to have at that moment a servant-girl who was thus rarely endowed, and inviting him in the interest of his studies to call and obtain a view of this very rare specimen of the organ. The Doctor had forgotten all about the incident, for a long time had elapsed without the appearance of the artist, when, one night after eleven o'clock, when the whole family had retired and the street was as silent as the grave, a tremendous peal sounded on the front-door bell, and the Doctor, putting his head out of the window, in anticipation of a summons to attend an urgent case, was greeted by a voice from the door-steps, saying, "Doctor,

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I have come to take a look at your servant-girl's nose." Doubtless there was a mournful silence for a moment, for the Doctor was always deliberate, but always courteous, even in his night-clothes. Then his voice replied through the still night, "I much regret that you will have to call at some more opportune time, for my servant-girl's nose is in bed." Then there was a soft closing of the window, doubtless a mild anathema, and silence, broken only by the footfalls of the retreating artist, who never re-appeared.

The nose is associated in some mysterious way with character, apart from intellectuality. So close an observer as Dickens makes, in "Little Dorrit," the execrable Blandois, *alias* Rigaud, exhibit a peculiarly significant facial trait, of the nose coming down as the lip goes up, indicative of a secretive, treacherous, and sinister nature. It is always a bad sign of the nature when the smile is the worst expression of the face. Certain cants of the nose to the side, if they are not congenital malformations, or derived from accidents in parturition or in after-life, are as clearly indicative of obliquity of moral vision as is the nasal organ itself evidently set crooked on the face.

Rare, indeed, is it, if the exceptions are signal, as in the cases of Socrates, that intellect is coupled with a turned-up nose and spreading nostrils. Even the pretty *nez retroussé* (snub) of the French never stands for anything but a certain pertness and *espièglerie* of disposition, very remote from the order of mental endowment of womankind graced with vivacious wit, free from malice and the kittenish calibre of their less favored sisters.

Rare, indeed, is it to find a pugilist who has any other type of nose than one of a class as well defined with reference to its associations as is the bull-dog's with reference to its breed. Noses of a very different sort indicate fighters of a very different from the pugilistic stamp. Just as it was remarked, in connec-

tion with the case of Socrates, that it is rare to find high intellectual qualities conjoined with a broad, upturned nose, so equally it holds true of the conjunction of high moral qualities with such a feature. Socrates was, therefore, an exception to both rules, that the large, well-developed nose is indicative of intellect and refinement. Intellectual men are generally characterized by very large noses, and especially is this manifest in the case of great statesmen, generals, and conquerors. Of course we must make allowance for ethnic differences, the differences by which races are characterized, and not demand as large a nose of Attila, the Hun, as of some conqueror of another race.

But wholly apart from the quality of mind that makes conquerors, great generals, or statesmen, it will be found that men of marked distinction of mind in all walks of life are characterized by larger and more distinctively accentuated noses than are possessed by men of average ability, and of course the same thing holds good of women. Doubtless Michel Angelo's nose was a very good specimen of the artist type of nose, when it was in early life broken by the mallet of a fellow-student of sculpture.

The characteristics of distinguished generals as to the form and size of the nose is pretty generally recognized, even before the powers of observation have had much scope for exercise, or much information has been derived from reading, as we can judge from an anecdote of General Meade, told of him by some of his classmates at the Military Academy at West Point. It seems that the cadets of his class were fond of joking him about his large nose, and that he, who had a great fund of quiet humor, used to reply to their fire of witticisms by tapping his nose on one side and saying, "Great soldier, great soldier!" Much evidence has reached us through life, going to show that there is a very general appreciation of the fact of this trait of a large nose generally meaning intellectual superiority, and certain

forms of it a military bent of superiority, and also that there is a very general appreciation of the fact that the opposite extreme, the small, snub variety of nose, is indicative of mental inferiority, often conjoined with comic disposition and alimentary and bibulous propensities. But all the existing intermediate varieties of nose, as indicative of mind and temperament, are very far, indeed, from being recognized in their full significance, and most persons who would claim profound insight into a person by looking into the eye would never think for a moment of consulting the nose as any index to mind and character, and yet the nose is there much more helplessly than the eye to testify as to the worth or worthlessness of its possessor.

The nose is sometimes the seat of the most violent inflammations. Inebriety sometimes leaves its mark there in the manner in which Bardolph was afflicted. The disease of rosacea, in the form of rhinophyma, which was what Bardolph had, has other sources besides those of excessive drinking, that are not popularly known, and hence one innocently a sufferer is sincerely to be pitied as having to bear not only the disease, but the most unjust conclusions regarding its cause.

Lupus, popularly termed cancer, but not regarded by physicians as true cancer, sometimes attacks and rapidly destroys the nose, being, in respect of its capacity to destroy the tissues, like cancer, thus leading naturally to the popular designation of it. Sometimes from a small centre of irritation, as, for instance, a broken and unkindly-healed mole, which has been subjected to fierce alternations of heat and cold (the causes are numerous that are capable of setting up inflammation in such a place), there arises a morbid affection known as epithelioma. These cases seem extremely trifling at first, hardly worthy of notice, but, like the spark that is capable of causing the great conflagration, they do not bear letting alone. The electric needle at once extirpates such growths in their incipient stages. We

have known of the case of such an excrescence that had been successively treated by perforation with red-hot needles, when it grew again, and then by excision with curved scissors, which cut it out nearly to the bone, when it grew again; but we have never known of a case in which the electric needle has been used for extirpating one when it has returned.

There is nothing to be said here as to the toilet of the nose, save that it should be performed in private with the handkerchief, as that of the other exterior organs of the body may be with the wash-rag. We are sorry to say that in our public conveyances sanitary rules are not sufficiently adopted and enforced by the companies. Picking the nose is outrageously frequent. Only smoking is prohibited, and the rule against it enforced. But spitting is far worse, because some spit holds the germs of the bacillus of consumption, which may, in the form of dust, eventually find its way into a favorable soil in lungs predisposed to consumption, and this practice is not forbidden by the companies, although it is most prevalent in the cars among some classes of men, and although it is well known that consumption is contagious. The companies should also prohibit the unsanitary practices of cleaning the nails and picking the teeth in public conveyances, where they are to be constantly seen. These practices are doubly coarse, for refinement is nothing if not considerate of others, and nothing if not self-respectful enough to keep for privacy the offices of cleansing the person.*

* Singular to relate, it so happens that since these lines were written, last winter, and before they can be printed, notices have been everywhere posted in the cars about Philadelphia, forbidding spitting in them. We, however, let them stand in their entirety, as possibly useful instruction for the country at large, in which the habit of spitting in public places has always been very prevalent. We have seen roughs, immediately upon seating themselves in a car, whip out plugs of tobacco and help themselves to chews therefrom, with the air of having reached a place specially devoted to chewing. But, bad as this tobacco-chewing and spitting has been, it is as nothing compared with the filthiness and danger of expectoration upon the floor of the cars of phlegm hawked from the deepest recesses of the throat, heretofore constantly practiced in cars, in total disregard of cleanliness, and to the nausea of ladies and gentlemen.

CHAPTER XXXI.

FOOD IN ITS RELATION TO HEALTH, BEAUTY, AND PLEASURE.

THE subject of food, viewed scientifically, is too deep to be entered upon in a work of this kind, as the reader may judge when informed that great masters of dietetics have differed even as to the classification of food, and, therefore, of course, as to many details regarding it. Dunglison's summary of the simplest classification will receive the most general acceptance. He says that in nitrogenized food is included the fibrinous, albuminous, caseinous, and gelatinous elements; and that in non-nitrogenous food is included the amylaceous, saccharine, and oleaginous elements. Lastly, then, come the inorganic elements of food. He remarks, further, that the second category might be further simplified, for amylaceous food is convertible into sugar during digestion, and from either oleaginous matter may be formed.

What we have more particularly to consider is, not the scientific aspect of food as related to the human body, but the ordinary practices as to eating that lie before us in our daily walks in life. Even within this sphere the subject is so vast that it can be at best but skimmed over here. Since the primitive apple, through which man fell from grace, the tillers of the soil have made the earth to yield of its goodly fruits, and river, ocean, and air have been laid under contribution for the sustenance of the body and the gratification of the palate of mankind.

In the course of this process, certain countries have developed particular dishes, and their inhabitants have imbibed particular tastes. Hence, home-staying people have come to regard their tastes as the natural and true standard, and often decline even to make trial of new dishes, whether from their own

or other lands. But all tastes, including that in eating, depend upon education. What one is brought up to in childhood to eat, he generally eats with greater relish than he eats anything else. The ability, however, to acquire new tastes lasts through life, and one of the chief differences between cultivated and uncultivated people is, that the former, as compared with the latter, prolong through life to some degree childhood's capacity for acquisition of all sorts, including what relates to the delectation of the palate.

This difference among mankind is enormous. Nothing more clearly marks the provincial, the untraveled man, than the perfect self-satisfaction with which he holds that everything that enters into his habits, including the food he eats, represents the sole proper, preordained ways of the best-constituted man. Nothing can swerve him from the fixed idea that he possesses the true standard of food. He likes it, and therefore it is the best possible food, and no addition to or subtraction from it could be made without marring his bill of fare. Content with the wretched cooking to which he is often habituated, he will marvel at the discomfiture of some experienced traveler in face of the viands which he relishes as the best on earth.

Just the very reverse is the man of education, especially if he has been a traveler, and has seen many countries and many different ways. He believes, with Brillat Savarin, that he who discovers a new dish contributes more to the happiness of mankind than he who discovers a new star. He philosophically perceives that what has been to him previously unknown is equivalent, so far as he is concerned, to having been just discovered, and he sets himself to acquire new tastes in dishes, and does acquire them, if not with the facility of youth, at least with an advantage which not even youth possesses—a discriminative palate, that renders every new enterprise an acquisition likely to be successful in true directions. That there are

false directions is undeniable, for some food has been derived, not from choice, but from necessity.

In 1835 the tomato was just beginning to appear in this country as an article of food, excepting with the populations around New Orleans. Millions of people here had never heard of it, thousands had not more than seen it, or had more than taken a fugitive taste of it as grown for curiosity in a garden, and then known as a love-apple. Very few tables in the United States except those of the creoles of New Orleans and vicinity, or else people in the North, of French or Spanish extraction, ever had the tomato served on table in any form. It took years and years for general acquirement of taste for it, not because every one was trying to like it and could not, but because the majority of people assumed that they could never learn to like it, and would not try. We have been in a remote settlement where we were obliged to send some hundreds of miles for celery to make salad, and heard it described by the young lady of the house as tasting like raw rhubarb-tops, and not for worlds would she touch the salad into which it was made, because of the presence in it of sweet-oil, although fat pork was the habitual food of the region.

This same indisposition to acquire new tastes pervades all the affairs of life with such people. We knew one such, where the person wept the first time that she was obliged to sleep on a hair-mattress instead of the accustomed feather-bed, and yet some months afterward she came very near weeping again because she had to sleep on a feather-bed instead of the hair-mattress, which in the meantime she had been using upon compulsion.

Many instances we could adduce in support of the point to which we are speaking. The point is that, with very many people, variety is not the spice of life. It takes a certain amount of general education, thought, and experience, and a certain

consequent ductility of mind, to make variety seem the spice of life. Old age brings to the majority of people dislike for variety of all sorts. They do not wish to learn more, to do differently in any respect from what they happen latterly to have fallen into the way of doing. They sometimes desire never to go beyond the limits of their city, town, or village; then never to go beyond the enclosure of the dwelling; and, with a final degeneration, they sometimes bring up, while still in the enjoyment of good health, by frequenting only one room, and being perfectly satisfied in only one chair. As these same traits are observable in lesser degree even in youth, it follows, manifestly, that some persons are born old.

On the other hand, with well-adjusted mental and bodily mechanism, coupled with education, variety at all ages never ceases to be the spice of life; and, so far as food is concerned, variety may, in a certain sense, be said directly to represent life. The more various the diet, the better is the health and the enjoyment of existence. When we find nations so situated as to be obliged to subsist chiefly on one article of food, we find the system liable to specific disorders. Only recently, Dr. Takaki, of Japan, has accomplished a good work there in ameliorating the condition of the sailors of the Japanese navy, through his recommendation to the government to substitute bread, wheat, and beans for a part of the daily ration of rice. Although rice is good food, yet by itself it is unequal to nourishing the system properly, and, in consequence of eating it as their almost exclusive diet, the Japanese sailors had been dreadfully afflicted with the disease known as beriberi.

It is not difficult for the Japanese to adopt new practices, however unaccustomed they may be. We remember once conversing with an educated Japanese, and his saying, "Yes, we want to adopt everything." He was too intelligent a man not to have known that, in adopting everything indiscriminately,

they could not fail to make some egregious mistakes. His thought, fully expressed, would have been:—We recognize European civilization as so superior to ours that, eager as we are to adopt it, we have no time at present to hesitate about its details. This wonderful aptitude of the Japanese for escaping beyond the centres of thought about which they have previously revolved for centuries accounts for much that is astonishing in their accomplishment upon the basis of good intellectual powers, —for such a thing, for instance, as a Japanese taking, in one of our first schools, the prize for English composition.

How different and far inferior in this respect, of wishing to acquire all that is desirable beyond the natal horizon, are the ways of some of the peoples of Europe who consider themselves far superior to the Japanese! It is a well-known fact, among men who have studied dietetics, that the consumption of indian-meal among the laboring classes of Europe would, on account of its cheapness, much ameliorate their condition. Yet, for fifty years and more, progress in the direction of inducing them to adopt it has been entirely disproportionate to the zealous efforts of philanthropists to introduce the meal in Europe as an article of general food.

Dujardin-Beaumetz, a distinguished authority on dietetics, remarks, in one of his recent lectures on the subject:—

We see still, in France, multitudes of our day-laborers in the country living on a dally fare in which meat constitutes hardly any constituent. But such writers as Kingsford [a vegetarian] forget that this kind of diet is imposed on the laboring classes by the poverty and misery of their situation, and certainly, the Irishman, who lives mainly on potatoes would be very glad to eat meat if he could get it.

This is an excellent case with which to illustrate tendencies that have grown, not out of habits, but of deprivation of what is known, liked, and impossible of frequent attainment. The reason for the craving of some of these people for certain aliments, and their inordinate indulgence in them when obtained, to which

aliments they have not been accustomed as an habitual diet, is to be explained by the fact that they have in their own country lived on the confines of such things as possessed by their more fortunate neighbors. The poor Irishman and Irishwoman who come to this country as emigrants have eaten meat and drunk tea, but not habitually, because they could not afford to buy them. They reach here a country, entirely unlike that described by Dujardin-Beaumetz, of apparently inexhaustible supplies. They now eat too much meat. Three times a day they demand it, and would take it a fourth quite willingly, and the wife has the teapot forever on the hob. These same people, however, acquire few new tastes in food, and eatables that are new to them generally remain unknown to the end. Not until the succeeding generation of the stock does it become americanized.

The traveled foreigner of every nation is in this respect almost a different human being. In every civilized country to which he goes, he tastes new dishes, seeks to make himself acquainted with their merits; even against difficulties, sets out to learn that they are insuperable for him before he desists. What pleasure have we not seen depicted in the faces of such foreigners in the face of a steaming tureen of terrapin or a dish of canvas-back ducks! Trifles truly make up the sum of life, and notably the sum of pleasure. Such persons live many pleasant lives in the capacity for the enjoyment of variety of all sorts. One of the trifles that go to make up the sum of life is the alimentary process, upon which the highest well-being and life itself depend, leading Cicero to say that a wise man has a wise palate.

Within our own land we witness egregiously the shortsightedness upon which we have been descanting. Few are the farm-houses where the savory pot-herb lends its flavor to the meat. In not one in fifty thousand is the delicacy of the mushroom known. In many they cannot tell the difference between a mush-

room and a toad-stool, and yet even little children learn to distinguish between them, and gather the mushroom for the table in places where it is appreciated. Within twenty-five years we have found parts of the country where farmers throw away the sweet-bread as refuse, not long before that the general practice of the country. We have witnessed three stages, the throwing away of the sweet-bread, the giving of it away to customers for other things, and lastly the sale of it at quite a high price. Soup is the rarest possible thing in an American farm-house; indeed, we have met one where the people had never heard of such a thing as soup. Yet in France, which bears the palm of cooking from all the world, the *pot-au-feu* is a mere incident of cooking, so much is it a matter of course. Into it all the sapid, savory bits go, that would not be useful for any other purpose, and, with or without a little added stock, a delicious and nutritious soup is made with the addition of a little seasoning. The *pot-au-feu* (pot standing on the fire) is a labor-saving institution, and an economical institution, and an anti-dyspeptic institution, for he best begins dinner who begins with soup. "Something substantial" is the cry with men who do not understand the art of eating, ignorant that the best way to prepare the stomach to deal with something substantial is to set it gently to working with something comparatively light. We have seen a man in a restaurant, on a reeking August morning, eating a sirloin steak all to himself, when sensible people around him were preparing for something a little more solid by eating the daintiest iced musk-melons.

Considering the bountifulness of this land in all that can contribute to the table, the general cooking seems all the more execrable. Praise of plain cooking is cool self-ascription of a virtue that has no existence, and an aspersion of an art by one who does not pretend to be a votary of it. There is no true plain cooking but among cannibals, where all condiments are

neglected. The plain cooking of civilization is only an imitation of this. It is the negation of all that the art of cooking summarizes in the well-being and pleasure of man. The vaunting of plain cooking is an inheritance from the Englishman of Hogarth's times, when the French were represented by the English as living almost exclusively on frogs, and only Englishmen as properly fed with the good roast beef of old England. Hence, also, was derived such a term as "kickshaws," from the French "*quelque-chose*," as expressive of contempt for French dainties. But if the reader will look closely into the matter, he will find that the cookery of England at that time down to the very present was, and is, with the exception of a few national dishes, French cookery, even by French cooks, with all who could or can afford to keep them. The English cooking of the commonalty, the typical cooking of England, is now what it always was, crude in the extreme, and remains of this, still abiding with us, are of the cannibalistic order described, and euphemistically denominated in this country, plain cooking.

Out upon such transparent humbug! If a man or woman cannot even broil a steak decently, they tell you that they do not pretend to be more than plain cooks. A plain cook of either sex is a person who brings fire and meat and vegetables together and lets them fight it out among themselves for a dinner. Unfortunately, the fight does not end there, the next bout being in the stomach of the unfortunate partaker of the repast, and the next, perhaps, with the doctor as bottle-holder.

Depend upon it that cooking is an art, and that plain cooking is the absence of all art. Depend upon it that cooking is a chemical art; not that one must study pharmacy to achieve success in it, although we have known a cook inadvertently to produce an appreciable amount of soap in a dish by including in it the chemical constituents. The experience of millions of generations of stomachs, in conference with minds that have passed

away with the bodies to which they belonged, has resulted in a clinical knowledge of cookery, in its relation to the stomach, that is not to be ignored. Thus at least a portion of the world has had transmitted to it from preceding generations valuable knowledge of what it is profitable to eat, and, rising to æsthetic heights, what is in various degrees most agreeable to the palate.

The palate is not an infallible criterion of what is best fitted for digestion, but it is, nevertheless, to the experienced adult, a criterion of almost unerring judgment. The child is without experience with the palate as with everything else. Through a subtle bond of union of sentiment, so to speak, between the palate and stomach, the law, to which there is scarcely an exception, is that what is agreeable to the palate is digestible by the stomach. Of course, if the article of food is so very agreeable to the person as to induce surfeit, that fact does not militate against the statement made here. The case is merely one of want of judgment, and hence we find children more liable than grown persons to a surfeit. In some persons of educated taste, the discernment of the palate is so marked a characteristic of their organization, that they can place implicit faith in its decisions as to the digestibility of a particular food. There is a class of persons, we are aware, who, knowing full well that a certain article of food is indigestible to them, deliberately pretend that they do not know the fact, and eat of it. We are not speaking of such persons, but of a more sensible order of beings.

It should be considered that, with the stomach, as with all things else in mankind, habit must be reckoned with. The palate sometimes revolts at an unaccustomed food and the stomach resents its presence, to which food they afterward become reconciled and crave. When either palate or stomach is averse to the taking of such food, it is best to intermit trial of the same food for a brief time, and then make another essay to like it. Nothing can be more distasteful to every human being

than tobacco is when it is first tasted, and yet it is by just such a procedure that many a boy glides insensibly into being a chewer of the weed. If, after the cessation of trial to acquire a new taste, the article in question is approached the next time with less repugnance, it is certain that the taste for it is being acquired through habit. And the strangest thing of all in connection with these secondary tastes is, that the more difficult one is of acquirement the stronger the liking becomes, exceeding in strength even the primary tastes.

What we wish chiefly to impress upon the reader is that man is constituted so as to be nearly omnivorous, that when he finds among his own people, or among other peoples equally civilized, tastes to which they have not been driven by necessity, he has probably at the same time found dishes which, with a little practice, would be agreeable to his palate; and that when he becomes so reconciled to what was new to him, he may find among them some which have added largely to his pleasures of the table. He has added not only to his resources in health, but to those in sickness, for nothing is more difficult to resuscitate than a patient who has a small range of tastes, or is otherwise squeamish about his eating.

If you have children to educate, do not encourage them in likes and dislikes as to well-prepared food of all sorts. We do not mean that they should be forced to take what they dislike; that would frustrate the end in view; but that they should be encouraged in every way to partake of a variety of food, and to acquire new tastes. How pitiable it is to see, as we often witness, meagre, poorly-nourished children in houses of abundance, always selecting nothing but the white meat of chicken, never venturing even to taste the dark, and in other directions cultivating, with the weak connivance of their parents, similar habits of eating! Such as these, when grown to manhood or womanhood, are ill-fitted to meet the vicissitudes of life.

We are perfectly well aware that idiosyncrasies are so great that there are persons so constituted as to be unable to acquire any taste beyond those which they had in the earliest childhood. But these do not represent the average of mankind; indeed, they are abnormal, and are very limited in numbers. The average child can, with judicious management, of suggestion, persuasion, instruction, and even of payment in some form, be induced to try any new dish again and again, until the liking for it is insensibly acquired.

The old ascetic notion of the unworthiness of the body being so great as compared with the mind, that men can afford to despise and neglect it, has long since vanished. We know now, and to some degree proclaim and act upon the belief, held by some of the ancients, that a sound mind cannot exist save in a sound body. Our theories are good enough; it is our practice that fails. While a portion of the world is given to guzzling and spirituous bibbing, another portion lacks due sustentation from good, well-prepared, wholesome food. It is well known that much of the drinking among the lowest classes in populous cities arises from insufficient nourishment impairing the tone of the nervous system. But, again, there is another portion of the world which lives in the midst of abundance, within the bounds of moderation, well fed and well housed and adequately nourished.

To approximate as nearly as possible to the condition of these last should be the aim of those less highly favored by the goods of fortune,—those thousands of the overworked and underfed. But, unfortunately, there is among this class the least knowledge of how to make small means go in eating farthest toward health and pleasure. However, within a few years, there has been some advance in this direction, through the introduction of cooking-schools, and the publication of cheap cookery books and of newspaper articles on general and special dietetic subjects.

Our cookery in this country has been derived from vast foreign fields. The poorest of it came from England. If you wish to realize by a specimen the difference between cookery and no cookery, compare French-prepared kidneys with English-prepared kidneys, the one delicately prepared and minced, seasoned, *sauté* and sent to the table in a chafing dish; the other, the whole unsightly, corrugated kidney broiled, without a particle of discoverable seasoning, and sent to the table to be *carved*. Cookery in this country, at its worst in New England, and remaining unimproved except in the oasis of Boston, has been largely determined by the advent of great numbers of French, Italian, and other cooks in New York, Philadelphia, and others of our large cities. Through the French and Spanish population of New Orleans and vicinity a great deal of good cooking was transfused through the South and spread beyond. Other centres of skillfulness in the art had their influence in disseminating good methods,—Richmond; Charleston, S. C.; Baltimore; Philadelphia, once the favorite resort of foreigners; St. Louis, and, in later times, Chicago and San Francisco, places that had sprung up in days long after some of the first-named cities had become famed for the production of certain dishes. From all the large cities knowledge of cookery now radiates to a certain extent over the country, especially to the West, to which so many people from the crowded centres of population are constantly departing to make them their homes. But, after all, when we consider the immensity of this country, and the profusion of esculents with which it is blessed, at which foreigners of the amplest experience marvel, it must be conceded that the art of cooking is, as compared with the possibilities growing out of a population of over sixty millions of people, quite in its infancy.

It is said that if you be virtuous you will be happy. We prefer to parody the sentiment by saying that if you will abjure

plain cooking and learn the art of cookery, you will be virtuous, for there is no such imp as one born of dyspepsia, born of plain cooking, grandchild of Satan himself, who sends the cooking, not the cooks, for his own evil purposes.

The pleasures of the table mean the pleasure of conversation as well as that of eating. Silence at the dinner, when not taken alone, means feeding, not dining. It has been said that only man dines, that the brutes feed. We fear that man flatters himself too much by so sweeping an assertion. The best test of refinement at table is that of whether the meeting seems to be for the purpose of eating or for that of social intercourse. If the eating seems to be but incidental to the intercourse, the test is completely stood.

The pleasures of the table contribute directly and indirectly to beauty,—directly, by the consumption of appetizing food, and indirectly, by surroundings that promote easy digestion. To suppose that it matters not what one eats, so that the appetite is satisfied, shows want of common observation. The kind of food eaten largely affects the organization of every animal, including man. The habitual use of certain coarse foods becomes at once apparent through their effect on the skin. The lower animals that are eaten evidence in their appearance the influence of different kinds of food, and that influence, even to the different flavor of the flesh which different kinds of food impart.

It would be a mistake for any one to suppose, from what we have said in recommendation of variety in food, that it is to be construed as advocating great variety at any one meal. On the contrary, except on certain occasions, as at dinner-parties, where one may remain seated for hours, great variety is not desirable. For every-day life the most delectable variety is the variety of well-regulated sequence. Were we able to have on our table daily all the various products the market affords, it would be a

mistake to have them. Viands that are constantly seen and tasted pall upon the taste. A little air of strangeness makes us return to things with renewed avidity. Hotels are under a certain compulsion to furnish everything in the market simultaneously, because they entertain so many guests of different tastes. But one of the consequences of attempting to prepare so many dishes is that all of them are not well prepared. So, for the management of the private table there is a double reason for not having a great variety at any one meal, that the dishes which do appear, being limited in number, can all be made choice, and because the absent friends will soon bring with them renewed zest at their appearance.

The fact is that variety coming in the guise of a surprise is an immense fillip to the pleasure of eating and the ease of digestion. It may be that the new dish is nothing but an old acquaintance from which we parted not long since, but it is none the less welcome if it has come opportunely and does not stay too long. This introduces a phase of the table in which we have the profoundest sympathy with women. The mistress of the house generally knows exactly what is coming. No pleasant surprises in this regard are in store for her. The master of the house, on the contrary, is always being favored with them. This is one of the reasons why the majority of women so thoroughly enjoy any little treat in the way of eating in which they have had nothing whatever to do with the preparation. Not being able to see a way for them out of their difficulty, we can but extend to them our heartfelt sympathy, congratulate ourselves upon our more favored estate, and avail ourselves of every opportunity to make amends to them by affording them the pleasure which, like ourselves, they so heartily enjoy.

CHAPTER XXXII.

CLOTHING IN ITS RELATION TO HEALTH.

OUR province is not to speak more than incidentally, as we have already availed ourselves of the opportunity of doing, of clothing from the point of view of dress. It is simply to speak of clothing as a protective, healthful, and agreeable covering of the body.

To enable us to exercise, in the particulars mentioned, sound judgment with reference to the choice of clothing for different purposes, we should know certain fundamental facts regarding the behavior of the ordinary substances that, as fibres, are converted into clothing. This knowledge, coupled with appreciation of the fact that clothes do not, of themselves, make warmth or coolness, but are serviceable in cold weather to retain the heat that the body generates, and in hot weather to exclude the greater exterior as compared with the interior temperature, is sufficient, with one addition, to enable any one to understand the philosophy of clothing. That addition is, that it should be remembered that at all times the body transpires, or gives off moisture through its pores, and that this circumstance cannot be ignored in the selection of the material out of which the clothing is made.

As it is the heat of the body which is to be preserved, if we wish to be warm, or the excessive outside heat which is to be excluded, if we wish to be cool, the best fabric for both purposes must be that which is made of some substance that is relatively non-conducting to heat. Additionally, although we wish to retain or to exclude heat, the mesh of the fabric must always be adapted to allowing to pass through it the evaporation of the moisture from the skin. Hence, a suit of leather, such as knights

used to wear under their armor, must have been unhealthy. It was good as a non-conductor of heat, and had a certain degree of porosity, but not sufficient to make desirable clothing for the whole person.

Linen is not a good fabric for underwear, even in a hot climate, because linen is a good conductor of heat, presenting conditions just the opposite of those that are best suited for the purposes of clothing,—those which are secured by materials that are bad conductors. Linen, besides, readily absorbs the moisture of the body, which circumstance still further promotes the loss of bodily heat in a cold climate, or, in a warm climate, facilitates the passage inward of the excessive outside heat. This objectionableness of linen for underclothing, inherent in the physical constitution of the substance itself, we can obviate, when desirable, by wearing a garment under the linen composed of a material that is a bad conductor; but then, it will be observed, the linen has ceased to be an undergarment. With nothing but a single thickness of linen next the skin, a sudden drop of the outside temperature will cause a chill to strike to the very marrow. This is because the heat of the body passes readily through the slight opposition of the fabric, so good is it as a conductor of heat. We once tried to wear linen shirts in very hot weather, but found them, in alternations of temperature, far from agreeable.

On the contrary, nothing is more delightful for hot weather than are linen sheets. Here, the quality of linen in being a good conductor of heat serves well the heat-oppressed sleeper, conducting, as it does, the heat so rapidly from the surface of the body as to make radiation back to it inappreciable. Besides, the fibre of linen is round and smooth, rendering fabrics made of it singularly agreeable to the touch when coolness is desirable. An analogous though opposite gratification to that afforded from touching or seeing good blankets in the

winter-time is experienced from seeing and feeling linen sheets in the summer.

Taking it for all in all, wool is the best fabric for wear next the skin. But this cannot be said without the qualification that much depends upon the quality of the wool. We have a lively recollection of a terribly cold walk that we once took, with snow on the ground, through the open country, when, coming to a wayside store, it occurred to us to buy a pair of long, coarse, woollen stockings for protection from the severe cold. Such was the exacerbation to the skin from the rude material of the stockings, that by nightfall our legs were covered from ankle to knee with a profuse eruption, which subsided at once as soon as the active cause of the irritation was removed.

In heat-retaining and excluding merits, the common materials for clothing rank as follows,—woolen, cotton, silk. We have said sufficient on the score of linen. For outside garments, whether for men or women, it is admirable for hot weather. It is much used for dresses by men and women of tropical climates, the fine-linen market of Cuba being one of the best in the world.

Cotton is the most generally agreeable wear for undergarments, if not in immediate contact with the skin; at least, next to the garment which is in immediate contact with it. Our own opinion is that no climate is so hot that the health is not the better for wearing a woollen garment next to the skin. This, in tropical countries, should, of course, be of the texture that is known as gauze-merino. Cotton does not absorb moisture so readily as linen does, and, after all that we have said, it is hardly needful to remark that it is much warmer than linen. For socks or stockings it has, under certain conditions of their use, singular unfitness. To become footsore on a long pedestrian tour, one could not devise a better plan than to use cotton socks or stockings. That very peculiarity of the substance of which we just spoke, that it does not absorb moisture so readily as linen does,

should be expanded here into the fullness of the fact that it absorbs moisture very reluctantly. The consequence of this is, that the great exudation from the feet while exercising is largely retained, the sock or stocking, drying, becomes in places on the foot a hard, uncompromising mass, and the next thing one finds himself footsore. The proper footgear to walk long distances in, no matter how hot the weather, is woolen stockings, or merino ones, made of soft material.

Silken underwear is, for some skins, and in some conditions of health, the most delightful possible. It is a bad conductor, and therefore makes a good clothing for persons who do not come within certain categories of skin and health conditions. The question of whether individuals do or do not can be settled only by their personal trial, or by the opinion of a physician, guided by a full history of the case. In gouty and rheumatic affections, supposing that there is no contra-indication to the wearing of silk, the electrical condition that it excites in the skin is beneficial to persons predisposed to these affections. But this same electrical excitation of the skin is prejudicial in the case of cutaneous disorders. We knew a case, some years ago, where a tendency to rheumatic gout had been sensibly abated by the wearing of a complete suit of silk underclothing, when some years afterward an attack of senile prurigo in the same person was stimulated and heightened by continuing to wear the very garments that had proved so beneficial in counteracting the rheumatic-gouty tendency.

Of course color has much to do with the warmth of garments. Whenever there are heat and cold and light (and that, excepting with reference to light, is always), the color of garments enters into the determination of their qualities with reference to temperature. Taking an obvious case, if we should have a white woolen coat dyed black, it would become warmer, because, as black, the material would absorb more heat.

It would also, because absorbing heat rapidly, rapidly radiate it ; but, on the whole, it would be warmer than the white coat, at least as long as it was subjected to light, and to heat greater than that generated by the body. If, in continuous exposure to the weather, say in tent-life in the winter, a man should wear a black coat by day, and a white coat of the same fabric, weight, and make by night, he would best utilize heat—outer heat by absorption ; inner heat, or heat of the body, by its conservation. This is only stating in terms of illustration the preceding fact.

In our climate, the very best course to pursue with regard to change of clothing, to accord with change of outside temperature, is to have at least two, or even three, grades of thicknesses of underclothing, for spring, autumn, and winter wear, the thicker of which will sometimes find a place even in a sudden lowering of temperature in summer weather, and temporarily supersede the gauze drawers and undervest of that season.

At no season of the year should we be without some fabric, not muslin or linen, immediately next to the skin, and from what has been said, this fabric ought to be woolen, merino, or even silk, under the limitations mentioned. If this fabric performed no other function than that of absorbing and slowly liberating the moisture from the body, the practice of wearing it would be amply rewarded. If people would but remember that the aim of health should be to guard against the vicissitudes of weather, and to maintain equableness in the temperature of the surface of the body, there would be less sickness and death from colds, and a much larger aggregate of pleasure in the world. The gratification of the whim of a moment often leads a girl to an exposure to cold that costs her her life. A fall of twenty or thirty degrees in the thermometer, or a sudden chilliness of the air, should mean to sensible people the adoption of instant precautions to avoid cold.

• The unthinking portion of the world goes much more by the

almanac than it ever directly admits. We knew a man who, every spring, according to the almanac, used to say to his children, on the first fine day, "The back of the winter is broken ; I must change my underclothing," the result of which always was that he was confined to the house with a cold for the next few days. We know plenty of people who will not light a fire until they deem that the almanac warrants their having a fire. For our part, if the weather is cold enough we have a fire in July, and if it is hot enough we fan ourselves in December. So experience and common sense, and we, as their temporary representative, alike proclaim as reasonable.

CHAPTER XXXIII.

VENTILATION WITH REFERENCE TO HEALTH.

E.VERY one has some notion, however inadequate as a proper guide to practice, of the value of fresh air; advice to take fresh air being prescribed by every one for himself and others. This general notion, however, goes but a little way toward the proper regulation of life with reference to the necessity to health of having constantly an abundant supply of fresh air, for thousands of persons who realize the hygienic value of out-door air take not the slightest precaution as to securing purity of air in their dwellings; and yet, upon an average, more than the half of life is spent in-doors.

Therefore, to possess really valuable knowledge on the subject, such as leads to establishing the habit of ventilating, it is necessary that the requirement of the body as to pure air shall be known. Pure air is just as much the food of the body as comestibles are. The breathing of persons in the closed spaces called rooms vitiates the air. Every person by breathing contributes just so much poison to it constantly. The flame of an ordinary gas-burner makes a draught upon it equal to the breathing of it by four persons. Nature takes care of the purity of out-door air, and is ready to aid us in taking care of that in-doors; but if we do not accept the proffered aid, it does not compel us to do so. It merely visits this, as an infraction of one of the laws of health, with feebleness, sickness, and death.

An erroneous popular notion confounds warm air with impure air, and cool air with pure air. A room is not necessarily close because it is too warm, nor necessarily pure because it is cool. One of the most sickening of all smells is in the close, cold

houses of the wretchedly poor, who are constrained, in order to avoid suffering from cold, to exclude outside air as much as possible. Of course, both warm air and cool air may be impure to any degree down to foul, but, of the two kinds, the warm air is, under average conditions, likely to be the purer, because constantly tending to be purified by interchange of volume for volume with the outside fresh air, whereas the cool air remains relatively stagnant.

This last observation naturally leads at once to the inquiry as to what is the active agency in the purification of the air of houses. The determination of that question, and the best action deducible from it, make the basis of the whole art of ventilation.

To ventilate a house is not to purify the air in it, but gradually to get rid of the impure air in it by gradually replacing it with fresh air. The air in it is, as compared with outside air, always more or less impure; so our object should be so to dilute the whole intermingled volumes of good and bad air by a constantly entering volume of pure air, that the air of the house shall be virtually pure.

This purpose can be accomplished in two, and in only two, ways: by mechanical means, such as pumps and fans, and by natural means—action growing out of the difference of density of contiguous volumes of air. The mechanical means are best adapted to certain classes of buildings and to mines; the natural means are for all the world. It is only with reference to the latter that we are called upon to speak, for they represent ordinary ventilation.

Air becomes less and less dense, that is, becomes lighter and lighter, the more that it is heated. Consequently, air in houses tends to lie in what we may, for convenience, regard as a series of strata gradually growing from below warmer and warmer as they grow less and less dense in ascending to greater and greater heights.

In the winter-time, in the climate of Philadelphia, rooms are, when their occupants can afford to heat them at pleasure, at the temperature of about 70° Fah., and the outside temperature ranges from about zero to 40° Fah. We have, under these conditions, plenty of motive power at our disposal to discharge the impure air from our houses, and take in place of it all the pure air necessary for health. If we foolishly caulk up and weather-strip every perceptible aperture, we should not be surprised at producing weakly conditions, nor even at the appearance of typhoid fever. We have unlimited pure air at our disposal, and all the necessary means of moving it, both furnished by nature. If we bar nature out from acting, we do it at our own cost.

The next question that arises is as to what is the volume of the stream of air that we should discharge from our dwellings, in order to insure that the corresponding volume of outside air received shall maintain that in the reservoir of the house in a virtually pure condition. Statistics say that the lowest permissible fresh air every hour for a grown person is 1000 cubic feet. A preferable amount to this is deemed to be 2000 cubic feet per hour, and some persons advocate even 3000 cubic feet per hour. Higher amounts are needed for the sick, some sanitarians recommending as high as 3000 to 4000 cubic feet for the sick. All these estimates are, of course, founded upon investigation of the degree to which air in a house is liable to become vitiated from breathing and other causes.

It follows, from what has been said, that the best ventilation is that which supplies ample amount of air without changing the temperature and without occasioning draughts. In turn it follows that outside air allowed to enter a building is best injected through many sources of supply, and best ejected through many vents. The proper movement of the air there, and the consequent purity of the air, depend as much upon the

possibility of exit as of entrance. If registers of a cellar-furnace are giving out in lower rooms of a house a large volume of heated air, it is certain that an equal volume of air is in some way or other finding escape from the house. But although, as we have said, the warmer the air is, the higher it will ascend, it must not be restrained from ascending. Like everything else in motion, it goes in the lines of least resistance. If the windows in the upper stories of the house are almost hermetically sealed, and those near the register are comparatively free for the egress of air, the hot air will escape through the latter, and thus be wasted for the useful office of passing through and warming and scouring out the upper rooms.

Draughts are obviated by the simplest precautions. In the best dwelling-houses, hospitals, and factories, the ventilation is effected by means of vertical shafts in the walls, so arranged that the ingress of fresh air is near the floor and of waste air near the ceiling, but so that the registers for these different purposes shall not be exactly underneath each other. But, without these appliances, by judicious use of windows, depressing the sashes above and raising them below, with guards, if necessary, for the open space below, all draughts in a house can be prevented, while, at the same time, it may be ventilated thoroughly. In the cold winter climate of this latitude, the ventilation may be sufficiently secured by means of the cracks in the sashes, if persons would forbear from a general weather-stripping of the house. Every case is a special one, to be considered and acted upon as such. The whole question upon which to base a decision is as to the fact of how much fresh air is being received. Different kinds of building result in such differences of permeability in different houses, that no general rule can be given as to whether or not to weather-strip, and, if it be decided to weather-strip, to what degree to have it done.

In the morning, after the family have risen and left their

sleeping-rooms, the bedclothes should be strewn loosely around away from the bed, and the windows be opened, much or little according to the outside temperature, the doors leading to the rest of the house being closed during the airing of the apartments. Bedrooms and bedclothing should thus be aired every day for not less than half an hour.

Unless the region is malarious, outside air should be freely but judiciously admitted through the night into sleeping-apartments. If the outside temperature is low, an opening that will keep the air of the room well renovated need be only half the size of that employed when the temperature of the outside air is twice as high. The direction and strength of the wind, too, are to be considered. If it is blowing directly toward the windows, it will change the air of the room much more than a calm would do it, or than a wind blowing in any other direction; it will change it, in fact, proportionately to the velocity as well as the coolness of the wind.

A very unjust prejudice exists against night air. The very same person who praises the earliest morning air and decries the air of night forgets that they are the same. Night air is perfectly wholesome in a healthy country. If you should ever have the opportunity of living in a tent properly constructed, with board floor laid on scantling, and with a protective fly, you will find that you never before knew the delight of pure existence. Do not, however, commit the folly suggested a few months ago by some inexperienced person, who recommended ladies to go to some place in the wilds for the summer, and there, as he phrased it, "plunge into the woods," by camping out. In the first place, a healthy camp is never pitched in the woods, but near them; and secondly, for people unaccustomed to such a life, nothing could be more arduous. We say, as one who has had pleasant experience in camp, and seen woful experience of others, that to enjoy camp life it is necessary to

have hewers of wood and drawers of water. To serve as these, and additionally, as cooks, is work, real hard work. It is absurd to suppose that life in camp does not entail household work, and ladies who plunge into the woods with the opposite impression will be very glad to plunge out of them.

One of the best of sanitary appliances for a room in the winter, and especially for the sick-room, is an open fire-place for burning wood. There is always a column of air flowing languidly up the chimney when the fire, temporarily unneeded, has been allowed to go out, and flowing rapidly up it when the fire is burning. Thus the room, supposing that it does not receive its chief supplies of air from neighboring tenanted apartments, is always kept in the most sanitary condition without the slightest perceptible draught. Even in the summer-time, the up-draught in the chimney is admirable for changing, purifying, and deodorizing the air in the apartment.

In heating houses by furnaces in the cellar there is no necessity of drawing your supply of air for the air-chamber of the furnace directly from the outside, if only your cellar is perfectly dry and sweet. In fact, if the cellar is, as it should be, in a perfectly sanitary condition, some air from the cellar should be utilized in the furnace air-chamber, even if you have a fresh-air conduit leading to it from the outside of the building; for the cellar, as well as other portions of a dwelling, needs its scouring out by a constant flow of pure air through it.

Much illness results from cellars kept in an unsanitary condition. Do not let a decayed fruit or vegetable or a piece of spoiled meat remain there for a minute. Inspect it regularly to make sure that domestics in your house do not violate some hygienic rule. We knew a case once where disease broke out in a house, and it was discovered that the domestics had been using one of the coal-bins as a receptacle for slops. If the condition of the cellar is perfect, it is for the best in the general ventilation

of a house, that the air should be drawn directly from the cellar, and indirectly from the outside, because the air in the cellar is thus constantly changed and remains purer than it can possibly be in any other part of the house. Remember, however, that when this plan is adopted there should be an ample opening in one of the cellar-windows, not less than that afforded by the taking out of a whole pane of glass, to allow of free access to the furnace air-chamber of the air from the outside of the house. Otherwise, air from rooms contiguous to the cellar, and in most houses from the kitchen, will be drawn down into the air-chamber to supply it with air as a substitute for that which is inadequately struggling to reach it through the cracks around the cellar-windows.

Would that we could influence the buyers and renters of moderate, small, and the slenderest means to compel builders to introduce on the house-tops of our large cities of this part of the country shaded places for family and friendly summer gatherings. Philadelphia is in most respects the city of cities for comforts, but the summer heats are not of these. Every one does not escape to Europe, the mountains, or the sea-shore. The majority must remain at home through long spells of exhausting heat. It is for such as these, as we have already tried indirectly to impress upon the general public, through an article contributed last winter to the *Medical Register*, that the sanitary effects and solace of pleasant house-tops are needed. From their use, the decrease in the summer mortality, especially among children, would be amazing to most persons, and the added boon that they would confer, during the heated term, on the life of stilling alleys and courts would be incalculable.

CHAPTER XXXIV.

THE CIRCULATION AND DIGESTION.

A WORK of this sort, in which so much has been said as to the bodily functions, should not omit some general mention of the special functions of the circulation of the blood and the digestion of food. Accordingly, before proceeding to our concluding chapters on miscellaneous matters, cosmetic articles, household recipes, etc., we give a brief description of these processes.

The popular notion of respiration is that it is represented only by an alternate expansion and contraction of the chest, corresponding to the inspiration and expiration of air. But, respiration being fundamentally the consumption of oxygen and the liberation of carbonic-acid gas and aqueous vapor, it takes place in other ways. The gills of the fish absorb the oxygen present in water and liberate carbonic-acid gas. The human skin aids the lungs to some degree by respiration. The unborn child, as we have already incidentally mentioned, respire entirely by means of the placenta of the mother,—a temporary organ of vascular character, which, known as the after-birth, follows the course which the latter name indicates.

Between birth and death the human organism breathes, as is well known, by means of the lungs, save, as has been indicated, to a certain extent by the skin. The vital functions of digestion and circulation, of which respiration is a part, proceed as follows: The food taken into the stomach forms a pulp, which has absorbed saliva and other fluids as the food finds its way to the more potent digestive fluids of the stomach proper. This pulp, known as chyme, is, then, a mass of food that has gone through some chemical change representing partial digestion; the process

of digestion being that which renders food fit for the renovation of the blood, and through it of the general system. In this condition the chyme passes from the stomach into the first part of the intestines, a short sac of greater diameter than that of the small intestine, which is continuous with it; the small intestine, in turn, leading into the larger intestine, which closes the alimentary tract.

This part of the bowels into which the food first enters from the stomach is called the duodenum. The duodenum is entered by ducts leading from the gall-bladder and the pancreas. The gall-bladder is the liver's reservoir for bile. The pancreas, which has been likened to internal salivary glands, secretes the so-called pancreatic fluid. At the point of time when the chyme enters the duodenum, nerve-signals transmit the fact to the gall-bladder and the pancreas, and they pour their fluids (bile and pancreatic juices) into the duodenum, and thereby a further chemical change is produced in the chyme, and it is converted into a product called chyle, representing the ultimate digestive elaboration of the food. The process continues by the absorption of the chyle by the blood through the intermediation of a multitude of ducts of exquisite fineness belonging to the lymphatic system. The main body of the chyle rises from the duodenum through a duct, called the thoracic duct, to an opening, under the left collar-bone, of a vein called the left subclavian vein, and also, to a lesser degree, by another duct into the right subclavian vein, and thence through the heart and the lungs into the general circulation, thus renewing the blood.

The product of lymph, as saturated with chyle and absorbed by veins and capillaries, may be regarded as a sublimated sort of blood. The process of the absorption of this renovating fluid does not cease at the point mentioned. Throughout the body is continued the absorption of the chyme, down to the small intestine, followed by the succeeding portion of the intestines,—the

larger intestine, or colon,—which becomes finally, in the rectum, a duct releasing the excrementitious matter to be voided by the system.

The mode in which sapid, or soluble, matters are utilized in the system having been thus briefly described, it remains only to speak of the general circulation of the blood, by which they are carried to different portions of the body. The heart, as is well known, is a force-pump. It consists of four chambers,—the right auricle and ventricle, and the left auricle and ventricle, with valves adapted to the functions now to be described. The blood is, by its automatic contraction of the right auricle, propelled from it into the right ventricle, and thence into the lungs, there receiving oxygenation. From the lungs it is received by the left auricle of the heart, which forces it into the left ventricle, which in turn transmits it to the greatest artery of the body, the aorta, whence by innumerable ramifications of smaller arteries, and through the net-work of capillaries connecting the arterial with the venous system, it reaches every part of the human organism, finally returning, through the venous system, to the right auricle of the heart. The blood-vessel system is provided with valves, so that the blood can flow in only one determinate direction, from the right side of the heart to the lungs, from the lungs to the left side of the heart, thence to the extremities of the body, and thence, on its return to the right side of the heart, to repeat the same round.

As might well be supposed of an animal so highly organized as man is, who owes his pre-eminence to a nervous system of extremely great relative power and delicacy, the organism is so adapted to its needs that the best blood goes to the chief portion of the nervous system, the controlling brain. This condition is based on a circulatory system of a higher order than that possessed by many animals. Whereas, in ranks of creation below that of birds, the arterial and venous bloods often commingle in

the heart ; in the heart of the most perfectly differentiated beings the arterial is separated from the venous blood. In some invertebrates, or spineless animals, the circulatory apparatus is so low in order that, instead of their possessing capillaries to convey the blood from the arterial to the venous system, these are represented in structure and function by lakelets, or what anatomists call sinuses, into which the arteries flow, and from which the blood is taken up directly by veins instead of by intermediate capillaries.

The significance of these differences is easily to be gathered from the consideration of the fact that the blood, according to its purity, is to be regarded as a more or less life-giving stream, and that the purer and more disseminated it is the higher the life will be. When the blood flows out of the left side of the heart into the aorta, it is a highly oxygenated, crimson tide, bearing its life-giving properties to every part of the organism through the minutest capillaries. As it returns to the heart, after a tour, which on the average lasts twenty seconds, it is laden with carbonic-acid gas and other effete matters representing waste of the body, has assumed a dulled look evidencing the fact of their presence, and requires again immediate renovation by a return through the heart to the lungs.

CHAPTER XXXV.

COSMETIC TREATMENT AND COSMETIC ARTICLES.

THE matter immediately following is a list of a few of the most elegant toilet preparations. It will be remembered, from what we have previously said, that we do not recommend hair-dyeing and similar practices, but, on the contrary, disapprove of them. Delicate powders, however, sometimes subserve excellent purposes in soothing inflamed surfaces of the skin, and no one can object to the refreshing employment of the finer perfumes. What we reprobate is the attempt, for it is but an attempt, to counterfeit beauty by artificial means.

Among the most delicate soaps of the world are Coudray's lettuce-juice soap, Brecknell's yellow-skin soap, Piver's *savon au lait d'Iris*, Bailey's spermaceti tablet-soap, Pinaud's. Opopanax soap, Rieger's transparent soap, Sarg's violet liquid soap, and the *pâte dulcifiée de la Société Hygiénique*.

Pure powders are Lubin's violet and rose powders, Pinaud's *millefleurs* powder, Chardin's *maréchale* powder, Piesse and Lubin's pistachio-nut powder, Ruimmel's *ylang-ylang* powder, Piver's *rose-blanche* powder, and Low's rose-leaf powder.

Delicate preparations for the hair are, Savage's ursina, or bears' grease, philcome oil, Coudray's pomades, Pinaud's *eau de quinine*, and Dupuytren's astringent pomade.

Good toilet-waters are Farina cologne, *eau de violette*, *eau de Kananga*, *eau de lavande*, *lait d'Iris*, *eau des Mandarins*.

Good stick-pomades are Lubin's violet pomade and Coudray's "*fixateur*."

Brilliantine gives a peculiar softness and lustre to the hair.

The best thing to fix the moustache in place is either Lubin's or Coudray's *pâte hongroise*. Good shaving compounds are

Pinaud's *crème d'Ambroise*, euxesis in tubes, the old Neapolitan soap, and the *savon pour la barbe*, manufactured by the Société Hygiénique.

If any one should take a fancy to try to make colognes or other preparations, the following recipes will afford some knowledge of the best compounds used :—

FARINA COLOGNE.

Oil of neroli,	1 drachm.
Oil of lemon,	4 drachms.
Oil of lavender,	½ drachm.
Deodorized spirit,	14 ounces.
Rose-water, sufficient to bring the mixture up to 1 pint.	

Macerate in a wooden vessel for the space of three months.

BANDOLINE.

Gum tragacanth,	1½ drachms.
Water,	7 ounces.
Proof spirit,	3 “
Otto of rose,	10 drops.

Macerate for one day, and strain the mixture.

The following recipe for cologne was awarded the prize by the *Chemist and Druggist*, two hundred and nineteen persons competing :—

EAU DE COLOGNE.

Oil of bergamot,	2 drachms.
Oil of lemon,	1 drachm.
Oil of neroli,	20 drops.
Oil of organum,	6 “
Oil of rosemary,	20 “
Alcohol, triple-distilled,	1 pint.
Orange-flower water,	1 ounce.

These were by British weights and measures, but it would not make much difference if American were used.

The following is an elegant preparation for the skin and lips :—

JELLY OF ROSES.

Finest Russian isinglass,	⅓ ounce.
Glycerin,	2 ounces.
Rose-water,	6 “
Oil of roses,	10 drops.

This preparation is usually kept in flexible metallic tubes, and squeezed out in small quantities as used.

This is a mixture of spices and flowers, dried, but not ground :—

JAPANESE POT-POURRI.

Lavender-flowers,	1 pound.
Rose-leaves,	1 "
Ground orris-root,	½ "
Crushed cloves,	2 ounces.
Crushed cinnamon,	2 "
Crushed allspice,	3 "
Table-salt,	1 pound.

Keep in well-sealed jars until ready to use it.

At any first-class pharmacist's the following preparations can always be procured: Cold-cream of roses, cucumber-cream, and rose lip-salve.

The three following preparations are for the removal of dandruff :—

Boracic acid,	2 drachms.
Cologne,	5 ounces.

Every other night rub into the scalp with a sponge.

Green soap,	4 ounces.
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Use from 1 to 3 teaspoonfuls of the above soap to ½ cupful of warm water, and rub the mixture into the scalp once or twice a week, being careful to wash the scalp thoroughly immediately afterward with warm water. Finally, rub the scalp with a rough, dry, warm towel.

Corrosive sublimate,	10 grains.
Cologne,	5 ounces.

Rub well into the scalp every night.

The following statement of fact is about all that is necessary in connection with bleaching the hair, that the only safe preparation for the process is peroxide of hydrogen. Perhaps we ought to repeat what we said in the body of this work, that it produces a most unnatural appearance of the hair.

The following recipe for hair-dye is that of Twiggs, of Mexican War fame, celebrated because he perhaps invented as well as used it :—

Precipitated sulphur,	1 drachm.
Acetate of lead,	1 "
Rose-water,	4 ounces.

Apply twice a day until the desired depth of shade is obtained.

The following hair-dye requires much more of an operation for its application than does the preceding one. First of all, the hair must be wet with the following solution, and then allowed to dry before the second one is applied :—

Sulphuret of potassium,	1½ ounces.
Solution of potassa,	½ ounce.
Pure water,	8 ounces.

The hair, as we said, having been moistened with the preceding solution, the following one is then applied :—

Nitrate of silver,	6 drachms.
Pure water,	8 ounces.

As this is liable to stain the hands, it becomes necessary to mention that the marks can be removed with hyposulphite of sodium.

Nitrate of silver is not considered a safe ingredient for a hair-dye; so we here acquit our conscience, in including this recipe, by giving at the same time to the reader full warning of what might be injurious. It would be fatuous for us to pretend that we can debar persons from using hair-dye if they have a mind to do so, and therefore we make no such pretense. We state explicitly, and have tried to demonstrate in the body of this work, the folly of using all such devices. Beyond that, and such additional warning as we have just given, our duty does not lie.

The two following recipes are for preparations for refining and imparting lustre to the surface of the nails :—

Ointment of oleate of zinc,	2 drachms.
Apply with friction to the surface of the nails, and rub in well at their base.	
Ointment of oleate of mercury,	2 drachms.
Lanolin,	2 “
Rub well over the nails and into the base.	

Having given at the beginning of this chapter the names of such powders as can be purchased, we here add some original recipes for face treatment, that can be made up in the household.

The first two are not for powders, but for lotions, for greasy, shiny, and rough skin of the face :—

Corrosive sublimate,	8 grains.
Glycerin,	2 ounces.
Distilled witch-hazel,	2 “
Apply to the skin with a sponge, or a piece of soft, old muslin.	
Boric acid,	1 drachm.
Distilled witch-hazel,	4 ounces.

Apply to skin with piece of old muslin, or with piece of absorbent cotton.

The three following recipes are for face-powders :—

Powdered oleate of zinc,	$\frac{1}{2}$ ounce.
Powdered arrow-root,	1 “
Oil of bergamot or of roses,	3 drops.

Dust over the skin.

Very fine prepared chalk,	1 ounce.
Subnitrate of bismuth,	1 “
Oil of roses,	2-drops.

Dust over the surface. This powder is especially adapted for a greasy, shiny, rough, or red condition of the skin.

Impure carbonate of zinc, finely pulverized,	1 ounce.
Carbonate of magnesium,	1 “
Oil of verbena,	5 drops.

This makes an elegant toilet-powder of a slightly pinkish hue. Dust it lightly over the skin.

The three following recipes have just reached us through the *Druggists' Circular and Chemical Gazette* for May, 1890 :—

TEA HAIR-TONIC.

Bay-rum,	2 ounces.
Glycerin,	2 “
Alcohol,	2 “
Infusion of black tea,	10 “

Mix and perfume to suit. The tea infusion should be made very strong, say 1 ounce of tea (best quality) to 10 ounces of boiling water ; let stand till cool, strain, and add the other ingredients.

TOILET-VINEGAR.

Essence of bergamot,	20 minims.
Essence of ambergris,	4 drachms.
Essence of vanilla,	30 minims.
Oil of neroli,	30 “
Acetic acid (strong),	160 “
Alcohol,	6 ounces.

(A minim is the sixtieth part of a fluidrachm.)

STRAWBERRY POMADE.

Suet,	15 ounces.
Lard,	25 "
Cacao-butter,	40 "
Fresh strawberries,	13 "
Otto of roses,	2 drops.
Oil of neroli,	2 "

Melt the fats in a water-bath, and introduce the fresh strawberries. The temperature must be kept very low, only high enough to keep the mass liquid, otherwise the strawberry aroma will be lost. After digestion (that is, soaking) for several hours, strain and, when nearly cool, add the essential oils.

We extract the three following recipes for almond-meal from the *Pharmaceutical Era* of May, 1890 :—

1. Ground almonds, 1 pound.
Wheat-flour, 1 "
Powdered orris-root, $\frac{1}{4}$ "
Oil of lemon, $\frac{1}{2}$ ounce.
Oil of bitter almonds, $\frac{1}{4}$ drachm.
2. Powdered almonds, 1 pound.
White castile-soap (dry and powdered), . . $\frac{1}{4}$ "
Powdered orris-root, 2 ounces.
Finely-powdered pumice-stone, 6 "
Oil of bitter almonds, 2 drachms.
3. Blanched sweet almonds, 18 ounces.
Ripe and dry beans, 18 "
Orris-root, 8 "
White castile-soap (powdered), 6 "
Spermaceti, $1\frac{1}{2}$ "
Dried carbonate of soda, 1 ounce.
Oil of bergamot, 6 drachms.
Oil of lavender, 6 "
Oil of lemon, 6 "

Beat to a fine powder, and keep from the air. Use, with a little water, to cleanse, whiten, and soften the hands, instead of soap.

The following are five different ways of making Florida water, which, as well as the succeeding four making Brilliantine, are taken from the *Pharmaceutical Era* of May, 1890 :—

1. Oil of lavender, 2 ounces.
Oil of lemon, 1 ounce.
Oil of orange-peel, 1 "
Oil of cloves, 5 drachms.
Deodorized alcohol, 1 gallon.

2. Oil of bergamot, 5 ounces.
 Oil of lemon, 3 "
 Oil of orange-peel, 2 "
 Oil of lavender, $3\frac{1}{2}$ "
 Oil of cloves, $\frac{1}{2}$ ounce.
 Oil of cinnamon, $\frac{1}{4}$ "
 Oil of neroli, $\frac{1}{4}$ "
 Alcohol, 4 gallons.
 Water, 1 gallon.
3. Oil of lavender, 2 drachms.
 Oil of bergamot, 2 "
 Oil of lemon, 2 "
 Oil of neroli, 1 drachm.
 Tincture of turmeric, 1 "
 Oil of balm, 30 drops.
 Otto of roses, 10 "
 Rectified spirits, 2 pints.
4. Oil of lavender, 4 ounces.
 Oil of bergamot, 4 "
 Oil of neroli, 2 drachms.
 Oil of orange, 4 "
 Oil of cloves, 1 drachm.
 Pure musk, 4 grains.
 Cologne spirits, 1 gallon.
 Tincture of tonka, sufficient to color.

Macerate fifteen days, and filter through filtering-paper.

5. Oil of bergamot, 8 ounces.
 Oil of orange, 4 "
 Best oil of lavender, 3 "
 Oil of cloves, $1\frac{1}{2}$ "
 True oil of cinnamon, $\frac{1}{4}$ ounce.
 Tincture of orris, $\frac{1}{2}$ pint.
 Tincture of Peru balsam, $\frac{1}{4}$ "
 Alcohol, 4 gallons.
 Water, 6 pints.

Mix, and allow to stand several days before filtering and bottling.

BRILLIANTINE.

1. Honey, 1 ounce.
 Glycerin, $\frac{1}{2}$ "
 Cologne, $\frac{1}{2}$ "
 Alcohol, 2 ounces.
2. Finest virgin olive-oil, 2 ounces.
 Any toilet-water, or Parrish's cologne, 1 ounce.

3. Gum benzoin, $\frac{1}{2}$ ounce.
 Alcohol, 8 ounces.

Dissolve and filter. Add—

- Castor-oil, 4 "
 Oil of geranium, 1 drachm.
 Oil of bergamot, 1 "

4. Veal-fat, 4 ounces.
 Spermaceti, 2 "
 Castor-oil, 2 "
 Oil of bitter almonds, $\frac{1}{2}$ drachm.
 Oil of cloves, 1 "
 Oil of bergamot, 2 drachms.

Melt together, adding the perfume when nearly cold.

We are pleased to see at last a protest against the severity of what is called "a close shave." In making a close shave, the barber keeps his fingers moist at the finishing touches of the operation, and, with the forefinger and the middle finger spread slightly apart, presses the skin both downward and outward, with the effect of actually making the lower part of the hair-shaft unduly project beyond its follicle. It is not the hair alone that is moved, but the little trumpet-mouthed follicle in which it grows is pressed downward over the hair, so as to cause it to protrude. The hair is thus, as it were, squeezed out of its follicle. Some one, it seems, as narrated in the *Medical Classics*, has had the curiosity to examine through the microscope the skin of a face after it had been closely shaven. He describes the cost at which one thus gets a very smooth face, as the removal of a thin layer of the cuticle, the laceration of the tiny blood-vessels at the orifice of the follicles, the exposure of the tips of the nerves there, and the rendering of the skin, as it appears under the microscope, like a piece of raw beef,—tender, unhealthy, and to so great a degree susceptible as to be provocative of colds, hoarseness, and sore throat.

CHAPTER XXXVI.

LIST OF MEDICATED SOAPS.

THE following soaps are used for many more purposes than those herein mentioned in connection with them. It would be useless to mention, for the information of the general reader, such applications of them as relate to diseases which invariably require the advice of a physician. Therefore, only such applications are included as come within the possibilities of popular treatment:—

ALUM SOAP, used in greasy seborrhœa, pustular eczema, etc.

AMBER SOAP, used for enlarged glands, moles, warts, etc.

ARNICA SOAP, used for abrasions, wounds, bruises, boils, carbuncles, sore nipples, etc.

BALSAM SOAP, used in indolent ulcers, etc.

BORO-GLYCERIDE SOAP, used for cleansing wounds and ulcers, and in allaying inflammation, etc.

CAMPHOR SOAP, frequently used for pruritus, accompanying eczema, chilblains, etc.

CARBOLIC-ACID SOAP, used in chronic eczema, etc.

CHAMOMILE SOAP, used for chafed surfaces, for seborrhœa, for excessive secretion of the skin, and foul-smelling sores.

CHAMOMILE AND SULPHUR SOAP, used in dry seborrhœa, loss of hair, etc.

ELDER-FLOWER SOAP, used for sunburn, etc.

ERGOT SOAP, used in eczema, etc.

EUCALYPTOL SOAP, used for foul-smelling wounds and ulcers, and also for fetid perspiration.

GLYCERIN SOAP, used for roughness of the skin, chapping, etc.

IODINE SOAP, used in serofulous skin affections, etc.

IODIDE OF SULPHUR SOAP, used for chronic ulcers, yellowish-brown or blackish patches on the skin, freckles, etc.

KINO SOAP, used for eczema, ulcers, etc.

LEAD SOAP, used for boils, carbuncles, abrasions of the skin, bed-sores, etc.

NAPHTHOL-SULPHUR SOAP, used for itch, lousiness, bites of insects, eczema, seborrhœa, and fetid perspiration.

NAPHTHOL SOAP, used for fetid perspiration, and in eczema, and for the bites of insects.

SALICYLIC-ACID SOAP, used in thickening of the skin on the palms of the hands and soles of the feet, for pustular eczema, fetid perspiration, foul wounds or sores, and for toilet purposes.

SUBLIMATE SOAP, used in animal parasitic diseases, for freckles, pigmentary spots on the skin, and effective in relieving itching of the skin.

SULPHUR SOAP, used in rosacea, etc.

TANNIN SOAP, used for ulcers, for excessive perspiration, oily seborrhoea, etc.

TANNIN-BALSAM SOAP, used for wounds, ulcers, chilblains, etc.

TAR SOAP, used in chronic eczema, etc.

THYMOL SOAP, used for ulcers, wounds, and in pustular eczema, etc.

TURPENTINE SOAP. This soap is sometimes known under the name of Starkey's Soap. It is used for chilblains, etc.

WINTERGREEN SOAP, used in eczema, etc.

WITCH-HAZEL SOAP, used in eczema, for fetid perspiration, and in loss of hair.

CHAPTER XXXVII.

HOUSEHOLD REMEDIES.

(Alphabetically arranged.)

BALDNESS.

1. Ointment of 10-per-cent. oleate of mercury, . . . ½ ounce.
Lanolin, or prepared suet, ¼ "

Rub well into the scalp.

2. Tincture of capsicum, 2 drachms.
Water of ammonia, 1 ounce.
Pilocarpine hydrochlorate, 5 grains.
Cologne, 3 ounces.

Use on the scalp twice a day.

3. Fluid extract of pilocarpine, 1 ounce.
Soap liniment, 3 ounces.

Rub thoroughly into the scalp, night and morning.

BITES OF INSECTS AND ERUPTIONS.

1. Beta-naphthol, 1 drachm.
Cologne, ½ pint.

Apply to the irritated skin. This is suitable for alleviating the smarting from the bites of any kind of insects.

2. Ointment of oleate of mercury, 1 ounce.
Camphor, 10 grains.

Rub well into the skin.

3. Ipecacuanha, 1 ounce.
Alcohol, 1 "

Apply to the skin.

BLACKHEADS OF THE SKIN.

1. Boracic acid, 1 drachm.
Alcohol, 1 ounce.
Rose-water, 2 ounces.

Use with friction twice a day on the skin affected.

2. Ether, 1 ounce.
Soap liniment, 1 "

Upon retiring for the night, rub into the spots affected, and in the morning wash the surface with hot water.

BOILS.

1. Menthol, 10 grains.
- Extract of arnica, $\frac{1}{2}$ drachm.
- Extract of belladonna, $\frac{1}{2}$ "
- Ointment of oxide of zinc, 1 ounce.

Spread the ointment on a piece of old muslin, and keep the boil constantly so covered.

2. Ointment of subacetate of lead, 3 drachms.
- Iodol, $\frac{1}{4}$ drachm.
- Ointment of oxide of zinc, 3 drachms.

Apply to the surface.

BUNIONS.

- Carbolic acid, 2 drachms.
- Tincture of iodine, 2 "
- Glycerin, 2 "

Apply with a camel's hair pencil every day. Copper oleate applied in the form of a plaster is also serviceable.

BURNS.

1. Immerse the burned part in cool water, and afterward paint it with oil of peppermint.

2. Boracic acid, 2 drachms.
- Glycerin, 2 ounces.
- Olive-oil, 2 "

Saturate a piece of old muslin or a piece of absorbent cotton with the lotion, and use it on the painful surface.

BURNS AND SCALDS.

1. Bicarbonate of sodium, $\frac{1}{2}$ ounce.
- Subnitrate of bismuth, $\frac{1}{2}$ "

Keep the surface covered with the powder.

2. Creasote, 15 drops.
- Cocaine hydrochlorate, 10 grains.
- Lime-water, $\frac{1}{2}$ pint.
- Linseed-oil, $\frac{1}{2}$ "

Apply constantly to the skin with soft, old muslin, or cotton.

3. Solution of subacetate of lead, 4 ounces.
- Tincture of opium, 2 "
- Distilled witch-hazel, 2 "

Apply to the skin with a piece of old muslin.

CARBUNCLE.

1. Take 2 ounces of bicarbonate of sodium. Dust it over the carbuncle, and allow the soda to remain on the skin until it becomes covered with a good many little openings. Then apply a poultice to the part, and follow that with a soothing ointment.

2. Compound resin ointment, 1 ounce.
- Atropine sulphate, 3 grains.
- Cocaine hydrochlorate, 5 "
- Camphor, 10 "

Apply constantly to the carbuncle.

CHAPPED AND CRACKED LIPS.

1. Borax, $\frac{1}{2}$ drachm.
- Glycerin, 1 ounce.
- Rose-water, 1 "

Moisten the lips frequently with the lotion.

2. Compound tincture of benzoin, 1 ounce.

With it pencil the lips once or twice a day, following the operation with the application of a little cold-cream or suet.

3. Take a 5- or 10-per-cent. solution of cocaine hydrochlorate, ordering about $\frac{1}{2}$ ounce of the apothecary. Apply it to the surface with a piece of old muslin, or with a piece of cotton.

4. Balsam of Peru, 1 drachm.
- Oil of peppermint, 2 drops.
- Ointment of rose-water, 1 ounce.

Apply to the lips with the finger.

5. Hydrochlorate of cocaine, 5 grains.
- Suet, or unsalted butter, $\frac{1}{2}$ ounce.

Use on the lips whenever they are dry or irritated.

CHAPPING OF THE SKIN.

1. Powdered oleate of zinc, 3 drachms.
- Subnitrate of bismuth, 3 "
- Lycopodium, 2 "

Dust over the surface.

2. Calomel, 10 grains.
- Carbonate of zinc, 1 drachm.
- Oil of eucalyptus, 5 drops.
- Ointment of rose-water, 1 ounce.

Apply to the skin.

CHAPS AND ROUGH SKIN OF THE HANDS.

1. Unsalted butter, 1 ounce.
- Acetate of lead, 30 grains.
- Carbolic acid, 5 "

Apply night and morning.

2. Glycerin, 1 ounce.
- Lime-water, $\frac{1}{2}$ "

Rub in several times a day.

3. Benzoated-zinc ointment, 1 ounce.
- Camphor, 5 grains.
- Subnitrate of bismuth, $\frac{1}{2}$ drachm.
- Rose-water ointment, $\frac{1}{2}$ ounce.

Rub in well, night and morning. It will soften and whiten the skin, while removing the roughness.

4. Suet, or lanolin, 1 ounce.
- Camphor, 20 grains.
- Glycerin, $\frac{1}{2}$ ounce.

Melt the ingredients together, then pour the mixture into some vessel, and allow it to cool. Soften a lump of the salve in the palm of the hand, and rub it well into the skin before retiring at night.

CHAPS OR CRACKS AT THE CORNERS OF THE MOUTH.

1. Take a 50-per-cent. solution of boro-glyceride, and apply it several times a day to the irritated surface.

2. Hypsulphite of soda, $\frac{1}{2}$ drachm.
- Ointment of rose-water, 2 drachms.
- Ointment of oxide of zinc, 2 "

Apply frequently to the surface.

CRACKS AND IRRITATION AROUND THE NOSE.

1. Sublimed sulphur, 20 grains.
- Camphor, 5 "
- Ointment of oxide of zinc, 1 ounce.

Apply to the irritated surface.

2. Cerate of subacetate of lead, 2 drachms.
- Cocaine hydrochlorate, 3 grains.
- Prepared suet, or lanolin, 2 drachms.

Apply to the irritated surface.

3. Distilled witch-hazel, 1 ounce.
- Camphor-water, 1 "

Mop often over the surface.

CRACKS OR FISSURES OF THE SKIN.

- Glycerin, 3 ounces.
- Tannic acid, 5 drachms.
- Rose-water, 2 ounces.

Apply with a piece of absorbent cotton.

CRACKS OR IRRITATION INSIDE OF THE NOSE.

1. Ointment of oleate of zinc, $\frac{1}{2}$ ounce.

Apply with the end of the finger, or with a camel's hair pencil. The powdered oleate of zinc blown up the nostrils with a quill is also beneficial.

2. Glycerin, 1 ounce.
- Rose-water, 1 "
- Borax, or tannic acid, 15 grains.

Apply to the irritated surface several times a day with a piece of cotton, or with a camel's hair pencil.

CORN OR BUNION.

1. Extract of cannabis-indica, $\frac{1}{2}$ drachm.
- Salicylic acid, 1 "
- Collodion, 4 drachms.

Pencil over the corn or bunion every night and morning.

2. Chrysarobin, $\frac{1}{2}$ drachm.
- Cocaine hydrochlorate, 10 grains.
- Gutta-percha, $\frac{1}{2}$ drachm.
- Chloroform, 5 drachms.

Pencil every night over the corn or bunion.

DYSPEPSIA.

We are loth to prescribe the chewing of gum for dyspepsia, so vulgar is the habit of chewing it for pleasure. It is our duty, however, to state that it is useful in dyspepsia. It stimulates the flow of the salivary and gastric fluids, and thus somewhat assists digestion.

FALLING OF THE HAIR.

1. Distilled witch-hazel, 5 ounces.
- Corrosive sublimate, 10 grains.

Use on the scalp twice a day.

2. Tincture of nux vomica, 1 ounce.
- Spirits of rosemary, 2 ounces.
- Alcohol, 2 "

Apply several times a day.

3. Oleic acid, 2 ounces.
- Spirits of lavender, 2 drachms.
- Cologne, 2 ounces.

Apply to the scalp.

FEVER-BLISTERS.

1. Camphor, 5 grains.
- Powdered arrow-root, $\frac{1}{2}$ drachm.
- Subnitrate of bismuth, $\frac{1}{2}$ "
- Ointment of rose-water, $\frac{1}{2}$ ounce.

Apply frequently to the lips.

2. Glycerin, 1 ounce.
- Distilled witch-hazel, 1 "

Apply frequently, using old muslin, or cotton.

8. Carbolic acid, 5 drops.
 Suet, $\frac{1}{2}$ ounce.

Place the ingredients in a pan, and mix while heating them. Frequently apply the mixture, when cool, to the lips.

FRECKLES AND YELLOW DISCOLORATIONS OF THE SKIN.

1. Corrosive sublimate, 10 grains.
 Distilled witch-hazel, 2 ounces.
 Rose-water, 2 "
 Mop over the spots.
2. Oleate of copper, 10 to 20 grains.
 Ointment of oxide of zinc, $\frac{1}{2}$ ounce.
 Rub into the spots, night and morning.
3. Boracic acid, 1 drachm.
 Ointment of rose-water, $\frac{1}{4}$ ounce.

Use on the spots twice a day.

FROST-BITE.

1. Ointment of oleate of lead, $\frac{1}{2}$ ounce.
 Hydrochlorate of cocaine, 10 grains.
 Use externally on the parts affected.
2. Compound tincture of benzoin, 3 drachms.
 Tincture of aconite-root, 1 drachm.
 Apply externally to the parts affected.
3. Salicylic acid, $\frac{1}{2}$ drachm.
 Sulphate of atropine, 5 grains.
 Collodion, 4 drachms.

Apply with a camel's hair brush.

HAZELINE CREAM.

Special mention should be made of a preparation which is in some vogue in London, and which is better than cold-cream for many applications. This is hazeline cream, compounded from the green twigs and leaves of the witch-hazel (*Hamamelis Virginica*). It combines the astringent and stimulant properties of these with the fatty, emollient base of lanolin. As manufactured by Burroughs, Wellcome & Co., of London, each pound of the ointment contains 5 fluid-ounces of hazeline with 11 ounces, by weight, of lanolin.

It affords a soothing ointment in all cases of irritation of the skin, and has one great advantage over cold-cream, in its insusceptibility to become rapidly rancid, which circumstance so frequently renders cold-cream injurious instead of beneficial. It has consequently proved to be a very effective application in hæmorrhoids, pruritus ani, etc., where the heat of the parts is certain to cause ordinary unguents rapidly to degenerate when in contact with them. Other medicaments, as the case may require, are sometimes added to the hazeline cream. It is sometimes applied to the rectum by means of Ward Cousins or Allingham's ointment-injectors, and by means of collapsible tubes with nozzle attachment for injection.

INFLAMED OR ROUGH SKIN.

1. Subnitrate of bismuth, 1 drachm.
Powdered arrow-root, 1 "
Ointment of benzoated oxide of zinc, 1 ounce.

Apply once or twice a day.

2. Boracic acid, 1 drachm.
Distilled witch-hazel, 2 ounces.
Rose-water, 2 "

Use externally.

ITCHING AROUND THE BOWEL.

- Camphor, 1 drachm.
Cocaine, 10 grains.
Lanolin, 3 drachms.
Ointment of benzoated oxide of zinc, 3 "

Rub in well, whenever troubled with irritation and itching.

ITCHING OF THE SKIN.

1. Alum, 1 ounce.
Borax, 1 "

Add 1 pint of hot water to these, and sponge the mixture over the skin.

2. Carbolic acid, $\frac{1}{2}$ drachm.
Distilled witch-hazel, $\frac{1}{2}$ pint.

Apply to the skin.

LANOLIN COLD-CREAM, POMADE, AND SOAP.

Lanolin, the fatty matter similar to that of the human skin, is employed for pomade, for cold-cream, and for soap. It is put up by Burroughs, Wellcome & Co., of London, a toilet kind in collapsible tubes, with a nozzle. As a soap it is manufactured in such a manner as to be neutral and possess an excess of fat. Ichthyol and eucalyptus soaps, containing a certain amount of the special medicament, are manufactured by the same firm upon the basis of the above qualities.

LAXATIVE FOR CHILDREN.

- Manna—in tears, 50 parts.
Calcined magnesia, 10 "
Washed sulphur, 10 "
White flour, 20 "

To be made into an electuary (that is, prepared with something that will make it palatable). A teaspoonful or more may be given in a cup of weak tea or hot milk. This is a French recipe.

MOISTURE OF THE HANDS.

1. Oleate of zinc, 1 drachm.
Subnitrate of bismuth, 2 drachms.
Beta-naphthol, 10 grains.

Dust frequently over the surface.

9. Mallicy's acid, 1 drachm.
 Impure carbonate of zinc, 1 ounce.

Dust over the surface.

8. Chromic acid, 5 grains.
 Distilled witch-hazel, $\frac{1}{2}$ ounce.

Especially useful for moist, clammy hands. Drop over the surface several times a day.

The four following recipes are for mouth-washes:—

1. Distilled witch-hazel, 3 ounces.
 Chlorate of potassium, 1 drachm.

This can be used as a wash for a sore mouth, or as a gargle for a sore throat. Employ it of the full strength.

2. Tincture of chloride of iron, $\frac{1}{2}$ ounce.
 Glycerin, $\frac{1}{2}$ "

The above is useful for sores on lips, tongue, mouth, or throat—canker-sores. Touch the sore spots twice a day with a camel's hair pencil, or a piece of cotton, dipped in the solution.

3. Compound tincture of cinchona, 4 ounces.
 Glycerin, 2 "

The above is useful for sore mouth, irritable or sore gums, and for sore throat. Add one or two teaspoonfuls to the same quantity of water, and rinse out the mouth and gargle the throat with it.

4. Tincture of kino, 2 ounces.
 Borax, 1 drachm.

For soreness or inflammation of the mouth or throat, wash out the mouth, or gargle with the mixture.

NETTLE-RASH (HIVES).

1. Carbolic acid, 1 drachm.
 Water, 1 pint.

Drop over the irritated skin.

2. Boracic acid, 2 drachms.
 Chlorine of lime-water, $\frac{1}{2}$ ounce.
 Chlorine of oxide of zinc, $\frac{1}{2}$ "

Apply to the irritated skin.

WIND OR IRRITATION OF THE SKIN.

- Cinchon, 20 grains.
 Sulphate of magnesia, 1 grain.
 Distilled water, 4 ounces.

Apply with a brush of bad hair over the surface.

PERSPIRATION (EXCESSIVE).

1. Subnitrate of bismuth, $\frac{1}{2}$ ounce.
Powdered oleate of lead-zinc, $\frac{1}{2}$ "

Dust frequently over the perspiring skin.

2. Beta-naphthol, 20 grains.
Salicylic acid, 1 drachm.
Powdered impure carbonate of zinc, 2 ounces.

Dust over the parts.

8. Hydrastin hydrochlorate, 5 grains.
Cologne, 4 ounces.

Apply frequently to the surface.

PERSPIRATION (EXCESSIVE OR ODOROUS.)

- Oleate of zinc, $\frac{1}{2}$ ounce.
Powdered starch, 1 "
Salicylic acid, 1 scruple.

Dust over the parts.

PERSPIRATION (ODOROUS).

1. Beta-naphthol, $\frac{1}{2}$ drachm.
Distilled witch-hazel, 4 ounces.

Apply well to the skin.

2. Powdered oleate of zinc, $\frac{1}{2}$ ounce.
Powdered boric acid, 3 drachms.

Keep the surface constantly covered with the powder.

PIGMENTED, OR DISCOLORED, SPOTS OF THE SKIN.

Use mercurial plaster, or take expert treatment with the galvanic current.

The following recipe comes highly recommended. It is for the removal of the pigment-spots that sometimes appear during pregnancy:—

- Cacao-butter, $2\frac{1}{4}$ ounces.
Castor-oil, $2\frac{1}{4}$ "
Zinc oxide, 45 grains.
Ammoniated mercury, 2 "
Oil of roses, sufficient quantity.

To be applied morning and evening.

PIMPLES.

1. Beta-naphthol, 5 grains.
Oil of chamomile, 5 drops.
Ointment of benzoated oxide of zinc, 1 ounce.

Use on the surface.

2. Ointment of oleate of zinc, 1 ounce.
- Ointment of rose-water, 1 "
- Camphor, 10 grains.

Apply on retiring for the night.

3. Boracic acid, 1 drachm.
- Distilled witch-hazel, 2 ounces.
- Glycerin, 2 "

Apply externally.

PLUGS OR GRUBS OF THE SKIN.

1. Boracic acid, $\frac{1}{2}$ drachm.
- Spirits of rosemary, 1 ounce.
- Water, 3 ounces.

Use with friction on the skin.

2. Tincture of green soap, 2 ounces.
- Distilled witch-hazel, 2 "

Apply the mixture every other day to the skin, and wash it off immediately with hot water.

POISONING FROM IVY.

1. Impure carbonate of zinc, $\frac{1}{2}$ ounce.
- Lime-water, 2 ounces.
- Glycerin, 2 "

Apply to the skin with a piece of soft, old muslin.

2. Carbonate of lead, 2 drachms.
- Powdered arrow-root, 2 "
- Powdered gum-acacia, 1 drachm.
- Hydrochlorate of cocaine, 10 grains.
- Olive-oil, 3 ounces.

Spread over the skin.

PRICKLY HEAT.

1. Lime-water, 4 ounces.
- Levigated calamine, $\frac{1}{2}$ ounce.

Shake up the mixture and apply it to the skin.

2. Subnitrate of bismuth, $\frac{1}{2}$ ounce.
- Carbonate of zinc, $\frac{1}{2}$ "

Dust over the parts.

ROUGH, PIMPLY NECK AND LIMBS.

1. Sublimed sulphur, 1 drachm.
- Oil of eucalyptus, 5 drops.
- Ointment of the oxide of zinc, 1 ounce.
- Ointment of rose-water, 1 "

Use once a day on the skin. Wash off the parts once or twice a week with the tincture of green soap, cleansing them with hot water, after which renew the application of the above ointment.

2. Beta-naphthol, 5 grains.
- Glycerin, 3 ounces.
- Cologne, 3 "

Use alone, or in conjunction with soap and hot water.

SCARS.

1. Lanolin, 2 drachms.
- Ointment of biniodide of mercury, . . . 1 drachm.

Rub in well once a day.

2. Iodide of potassium, 1 drachm.
- Ointment of nitrate of mercury, . . . ½ ounce.

Use on the parts.

3. Borate of sodium, ½ ounce.
- Salicylate of sodium, ½ drachm.
- Lanolin, 1 ounce.

Keep in contact with the scar by means of a piece of lint, or else rub in well with moderate friction, night and morning.

SORES ON LIPS, MOUTH, TONGUE, OR THROAT (CANKER SORES).

- Sulphate of zinc, 40 grains.
- Rose-water, or pure water, 1 ounce.

Apply every other day to the spots with a camel's hair brush or a piece of cotton. Canker sores can be touched to advantage every day or two with burnt alum or a piece of sulphate of copper.

SUNBURN.

1. Carbonate of lead, 1 drachm.
- Powdered arrow-root, 1 "
- Ointment of rose-water, 1 ounce.
- Olive-oil, 2 drachms.

Apply lightly to the surface.

2. Sublimed sulphur, ½ drachm.
- Carbonate of zinc, 1 "
- Ointment of oxide of zinc, 1 ounce.

Apply lightly to the surface.

THICK SKIN ON HANDS OR FEET.

1. Salicylic acid, ½ drachm.
- Ointment of oleate of lead, ½ ounce.

Spread on muslin and use on the surface.

2. Boracic acid, 1 drachm.
- Beta-naphthol, 20 grains.
- Lanolin, or prepared suet, 1 ounce.

Apply to the surface.

TOOTHACHE.

1. Creasote, 5 drops
- Tincture of opium, 10 "

Place in the cavity of the tooth a piece of cotton moistened with the mixture.

2. Cocaine hydrochlorate, 2 grains.
- Morphine sulphate, $\frac{1}{4}$ grain.
- Camphor, 1 "

Place in the cavity of the tooth a piece of cotton moistened with the preparation.

WARTS.

1. Solution of ethylate of sodium, 2 drachms.

Every two or three days touch the wart with the solution, administered with a camel's hair pencil.

2. Chrysarobin, 40 grains.
- Collodion, 3 drachms.

Apply with a camel's hair pencil every day or two.

WHITLOW—FELON.

1. Tincture of opium, 2 ounces.
- Lead-water, 2 "

Use on the part a piece of thin, old muslin, keeping the surface constantly wet with the lotion. The part sometimes requires lancing, to relieve pain and to restore it to healthy action.

2. Ointment of compound resin, $\frac{1}{2}$ ounce.
- Ointment of nitrate of mercury, $\frac{1}{4}$ "
- Cocaine hydrochlorate, 10 grains.

Apply before or after making a free incision with the lancet. Previously hot poultices are frequently applied to the part. Painting it with iodine is sometimes practiced.

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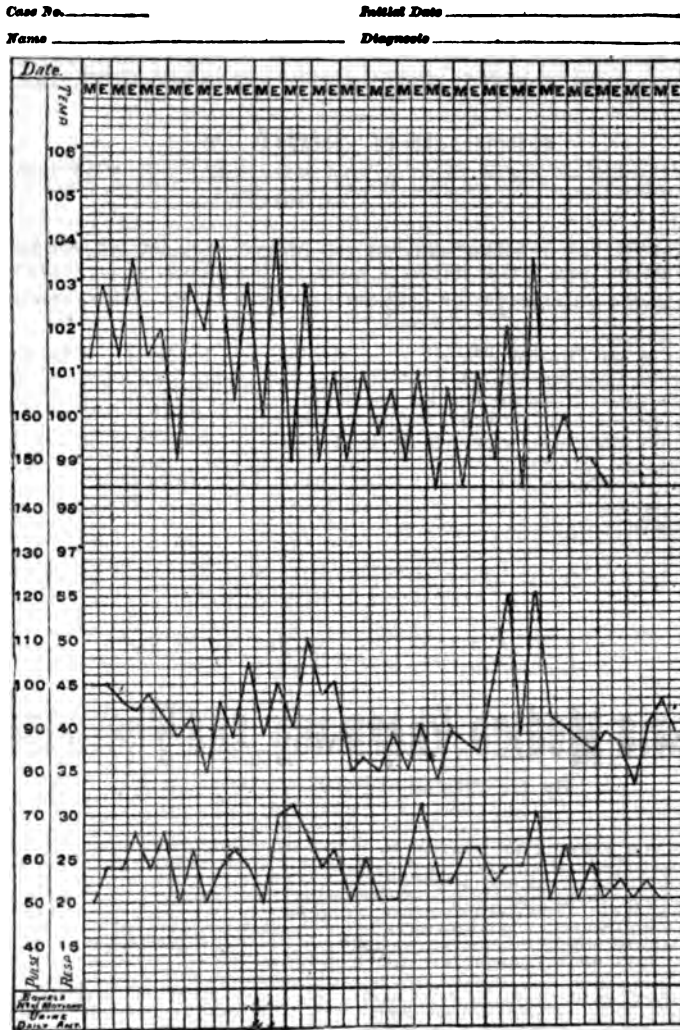
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FIG. 15.—AUTHOR'S FIBROID SPEAR.



FIG. 18.—BALL ELECTRODE FOR ADMINISTERING FRANKLINIC SPARKS.

CONTENTS

CHAPTER I, Introductory; II, Apparatus required in gynecological applications of the galvanic current; III, Experiments illustrating the physical qualities of galvanic currents; IV, Action of concentrated galvanic currents on organized tissues; V, Intra-uterine galvano-chemical cauterization; VI, Operative details of pelvic electro-puncture; VII, The faradic current in gynecology; VIII, The franklinic current in gynecology; IX, Non-caustic vaginal, urethral, and rectal applications; X, General percutaneous applications in the treatment of nervous women; XI, The electrical treatment of fibroid tumors of the uterus; XII, The electrical treatment of uterine hemorrhage; XIII, The electrical treatment of subinvolution; XIV, The electrical treatment of chronic endometritis and chronic metritis; XV, The electrical treatment of chronic diseases of the uterus and appendages; XVI, Electrical treatment of pelvic pain; XVII, The electrical treatment of uterine displacements; XVIII, The electrical treatment of extra-uterine pregnancy; XIX, The electrical treatment of certain miscellaneous conditions; XX, The contra-indications and limitations to the use of strong currents.

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FIG. 117.—PAROTID AND SUBMAXILLARY FISTULE IN THE HORSE, AFTER COLIN.
(*Thanhoffer and Ternay.*)

K, K', rubber bulbs for collecting saliva; cs, cannula in the parotid duct.

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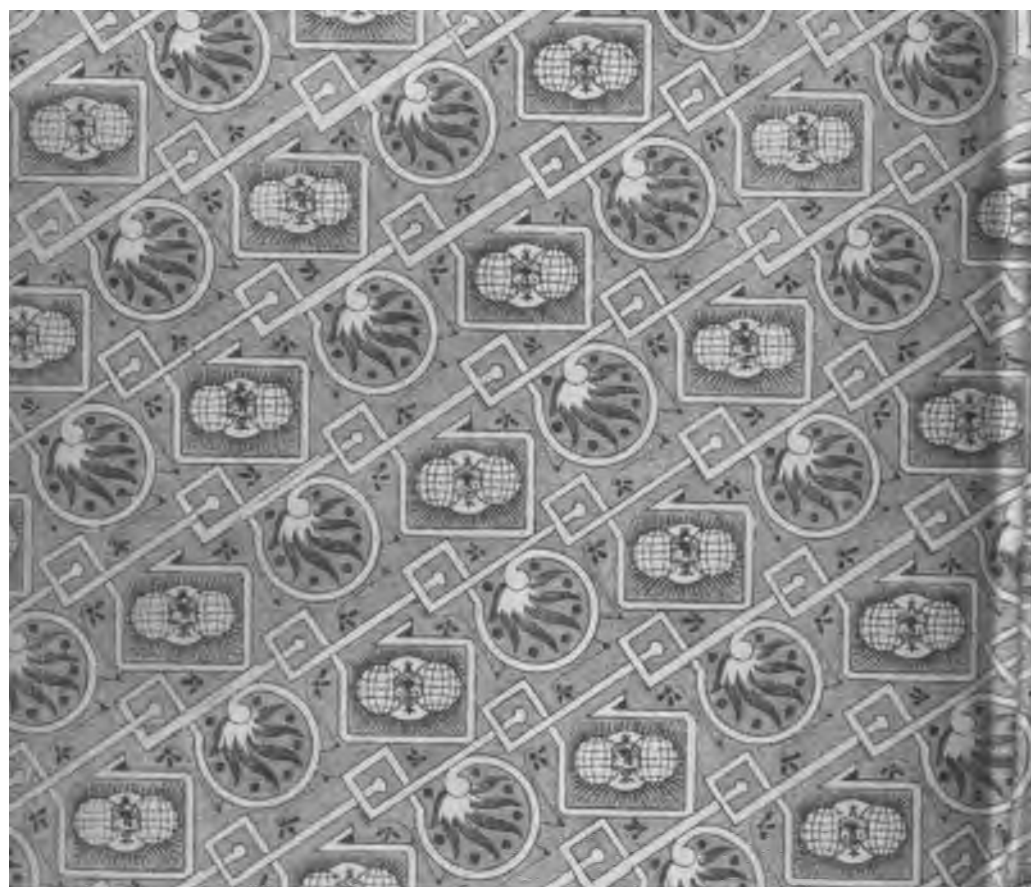
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